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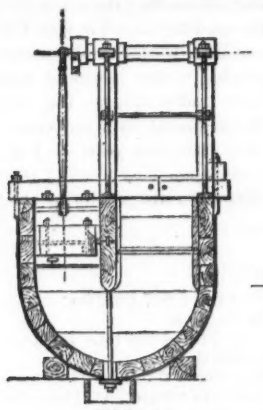

FIG. 1.

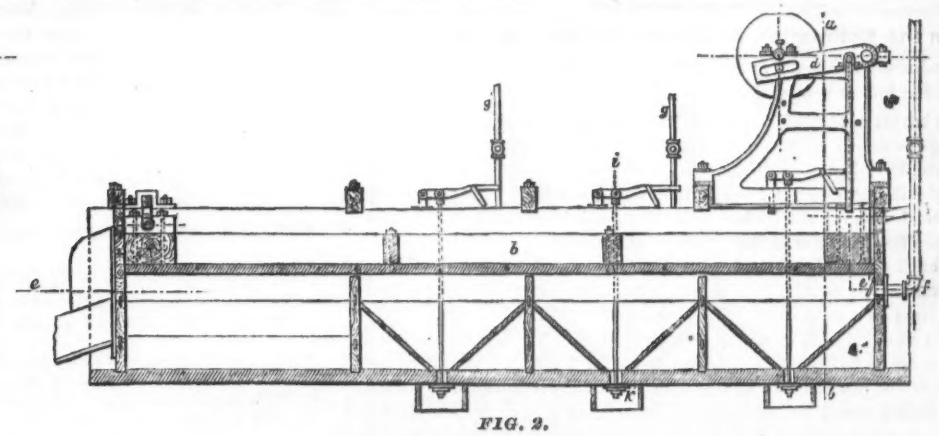

FIG. 2.

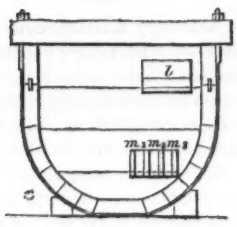

FIG. 3.

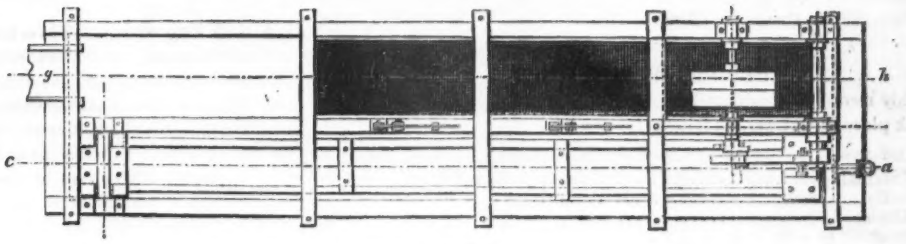

FIG. 4.

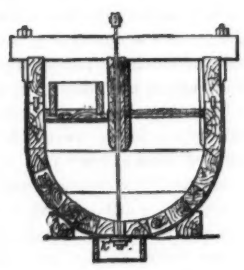

FIG. 5.

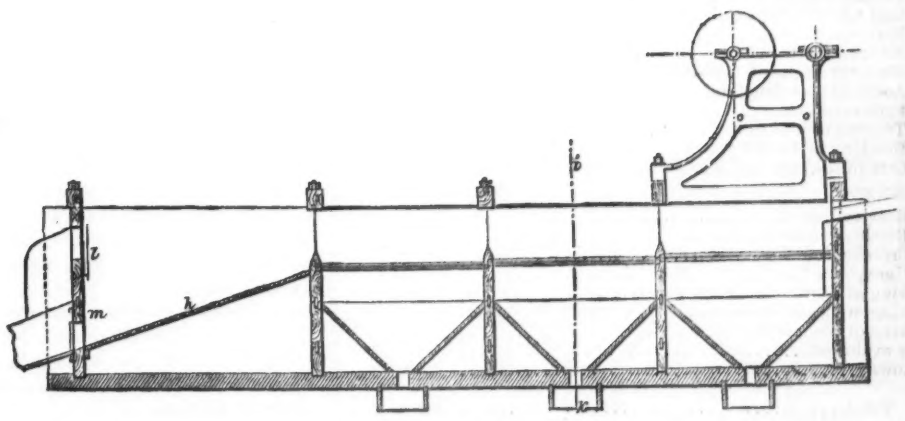

FIG. 6.

CAZIN'S ONE-PLUNGER JIG.

Cazin's One-Plunger Jig.

ABOVE we give six illustrations, giving sections of this machine, the operation of which is described in a letter from Mr. LOESCHER, in another part of this week's paper. The drawings pretty clearly explain themselves. Fig. 1 is a section through *a b* in Fig. 2; Fig. 2 is a section through *c d*, in Fig. 4; Fig. 3 is a view of the discharge, showing the slide or gate *l*, by which the quantity of water is regulated so as to keep all the sieves covered, and the escapes m_1 m_2 m_3, corresponding to *l* and *m* in Fig. 6; Fig. 4 is a horizontal plan; Fig. 5 is a section through *i k* in Fig. 6; and Fig. 6 is a section through *g h* in Fig. 4. The plunger is best seen in Fig. 1, and the manner of communicating motion to it, in Fig. 2. The sieves are seen in end-section in Fig's. 1 and 5, in longitudidal section in Fig. 6, and in horizontal plan in Fig. 4. From these brief comments, together with the accounts elsewhere given, and those formerly published (Jan. 21, 1873) in this journal, the reader accustomed to machinery and acquainted with ore-dressing will be able to derive a clear notion of this apparatus.

Ancient Forgings.

THE problem of the great wrought iron column at Delhi, 16 inches in diameter and fifty feet long, is thoroughly discussed by Mr. ST. JOHN VINCENT DAY in Article XI of the just issued Proceedings of the Philosophical Society of Glasgow. The conflicting descriptions of Cunningham & Forbes (in the Steel and Iron Institute papers of London) are adjudicated, and the whole subject of a great Iron Manufacture in India in the early and middle ages, now wholly vanished, is historically treated, in connection with the history of Iron in Egypt, Greece, China and Japan. We recommend this paper, and another by the same author in the same volume, entitled "On the Past and Present of Iron Smelting," to readers curious of such matters. The only possible motive power used in forging such a mass, steam power being unknown, seems to be that used by the Japanese—a sort of pile-driver worked by oxen. The *Railroad and Mining Register* suggests the hypothesis that the column may have been forged standing by welding on one over another their iron plates or discs, the fire being built around

the column as it grew, and the ground raised in a mound to keep the top of the column on a level with the work-place.

Quick Work.

THE Owyhee, Idaho, *Avalanche* says: "We challenge the world to beat the wonderful feat of single hand drilling accomplished this week by a Cornishman, named JAMES GOOEY, in the Golden Chariot mine. In one eight hour shift he drilled thirty-one feet in very hard rock, and in four eight hour shifts he drilled 110, being an average of twenty-seven and a half feet for each shift. The magnitude of this performance can be readily imagined when the fact is taken into consideration that good single-hand drillers only make from ten to twelve feet in an eight hour shift. GOOEY is a small man, though of compact and sinewy build. We venture to say that his work of drilling thirty-one feet in solid rock on an eight hour shift, has never been equaled anywhere in the world." Our contemporary could add to the value of its information, if it would describe the rock which this miner did such good work in. Was it trap, quartz or limestone, tough or decomposed?

On the Estimation of Sulphur in Pig-Iron, &c.

A SIMPLE and ready method of estimating the sulphur in pig-irons and steels, and one requiring but little attention, is as follows:—

Place into a beaker of about 300 c.c. capacity about 3·5 to 4 grms. of the sample, in drillings (weighed to within 0.01 grm. will be sufficiently accurate), and pour upon them 35 to 40 c.c. of aqua regia, consisting of 1 part HNO_3 with 2 parts HCl, maintaining the proportion of 10 c.c. of the mixed acids for every 1 grm. of the metal, keeping the beaker covered as well as possible with a clock-glass. After the first violence of the action has subsided, boil the liquid for a few moments until the whole of the iron is dissolved, then transfer the solution, with as little washing as may be, to a porcelain basin, and evaporate as nearly as possible to dryness on a water-bath. Treat the residue with some concentrated HCl, add about an equal bulk of water, and then filter. To the filtrate add a considerable excess of $BaCl_2$ solution, allow to stand for about twelve hours; filter, and weigh the precipitated $BaSO_4$ with the usual precautions. Multiply the weight of $BaSO_4$ found by 13·724, and divide the product by the weight of the iron employed; the result will be the percentage of S in the sample analysed.—CHARLES H. PIESSE, *in Chemical News.*

Railroad Accidents.

The monthly record of accidents kept by the *Railroad Gazette* shows that 88 disasters took place in October, as follows:

DERAILMENTS.		
Unexplained	18	
Cattle on track	9	
Misplaced switch	4	
Breaking of axle	4	
Broken rail	3	
Falling of draw-bar	2	
Rail removed for repairs	2	
Rails spread (maliciously)	1	
Malicious obstruction	1	
Striking wagon at crossing	1	
Accidental obstruction	1	
Failure of bridge	1	
Turning over of rail	1	
Breaking of tender wheel	1	
Cars pushed too fast into siding	1	50
COLLISIONS.		
Rear collisions	19	
Butting collisions	8	
Crossing collisions	3	
Unexplained	3	33
Breaking of locomotive truck wheel	1	
Breaking of locomotive by malicious obstruction	1	
Breaking of locomotive by land slide	1	
Boiler explosion	1	
Unknown	1	
Total	88	

Twenty-eight of these accidents caused 11 deaths and injured 47 persons, the remaining 50 being harmless to persons. During the 12 months ending with October there have been 1,342 accidents, 328 persons killed, and 1,326 injured. Since January 1, there has been an average of 3.67 accidents per day.

Touchy Workmen.

THE current history of English trade contains many examples which show the excessively touchy nature of the laboring man, whose feelings appear to be delicate in inverse ratio to the thickness of his natural epidermis. The celebrated Consett Iron Company, lately became involved in a foolish quarrel with their men, which arose in the following way: The men at one of the collieries have in time of scarcity been in the habit of getting water from a well near the overman's house. This official, however, not wishing to have the water disturbed so frequently, locked up the well. One of the men, a blacksmith, removed the lock, and subsequently received notice to leave the colliery. The matter was at once taken up by the other mechanics, who decided that, unless the masters at once withdrew the blacksmith's notice, they themselves would resign. The masters, however, refused to do so, and the men tendered their notice, following it up by a strike when the time expired. The mines could not be worked without the blacksmiths, and the miners, numbering 2000, were accordingly thrown out of employment. What the issue of the dispute was we have not yet learned, but at last accounts the miners were trying to patch it up. If the strike continues long, the blast furnaces will have to stop.

Trade and Wages in Scotland, Eastern Division.

The extreme activity in the coal and iron trades which characterized 1871, continued throughout 1872. The demand for coal has been unprecedented, and the supply, partly owing to insufficient railway accommodation and partly owing to the workmen, has not kept pace with it. The consequence of this state of matters was that the prices rose up beyond those of any former period, until coals which could be purchased in Hamilton at 5s. per ton two years ago, are now 16s. to 18s. per ton, and dross or small coal, which could be bought at 2s., is now selling at 10s. per ton. (See statement below.) In sympathy with the selling prices the miners' wages advanced to unheard-of rates, and at the present time the nominal day's wages of the collier is 10s. Notwithstanding the extraordinary demand for coal, and the high rate of wages, the quantity raised during 1872 was very little in excess of 1871. The miners have neither worked so diligently nor so steadily as in former years, and the increase is due to the increased number of hands, which high wages attracted from other trades, and to the use of machinery, whereby fewer men are required. At the lowest estimate between 2000 and 3000 more men are engaged in coal mining than last year. I have, as usual, got from coal masters in my district the wages made by some of their average workmen, and I find that a miner in the Hamilton district during the last year, hewed and filled 616 tons of coal:—

	£	s.	d.
For which he received	83	7	10
He worked 263 days, and lay idle 50.			
Another in the same district hewed and filled 607 tons for	78	8	3
He worked 218 days, and lay idle 95 days.			
Another in the Andrie district hewed and filled 624 tons for	76	7	0
He worked 212 days, and lay idle 102 days.			

Being an average, days worked, 231; wages, 6s. 10½d. per day worked.
In 1871, the average days worked was 279; wages, 4s. 11d.
In 1869, average days worked, 252; wages, 4s. 3d.

The Connections Between Colliery Explosions and Weather.

THERE are many statements which appear tolerably plausible until it is known upon what premises the conclusions have been arrived at, and after carefully studying the "Notes on the Connection between Colliery Explosions and Weather in the year 1871," by Messrs. R. H. SCOTT, F. R. S., and W. GALLOWAY, inspector of mines, it is difficult to form any other opinion than that most that has been published with a view to show that colliery explosions are connected with meteorological changes must be referred to this category, and pronounced unworthy of consideration. This seems indeed to be one of the many cases in which it has been striven to make the facts agree with the hypotheses rather than to accommodate the hypotheses to the facts. For probably the first time Messrs. SCOTT and GALLOWAY have given a diagram for an entire year of the barometrical and thermometrical changes, together with the colliery explosions which occurred from day to day, but the fallacy of the conclusions drawn from it is obvious; they show by squares, explosions which are apparently due to a fall of the barometer; by circles, those which are apparently due to a rise of the thermometer; and by triangles, those which are apparently not caused by either agency. At first glance such a diagram would appear to be invaluable as affording data from which useful conclusions might be drawn, but when it is considered that the meteorological record has no connection whatever with the districts in which the explosions occurred, confidence in the results recorded will be somewhat shaken; thus on January 1 there was a fall of nearly 1 inch in the barometer at the Stonyhurst Observatory, and on the following day an explosion occurred in the South Staffordshire and Worcestershire district, and the authors of the paper mark this as one of the explosions due to a fall of the barometer. Again, they argue that to a disturbance of the barometer at Stonyhurst on June 28 may be attributed on June 29 two explosions in South Wales, and one in the Midland district. Of course it is possible that the meteorological variations at Stonyhurst, and in the neighborhood of the collieries in which the explosions occurred, may have corresponded, but conclusions based upon premises the truth of which is only to be surmised are, to say the least, scarcely acceptable as scientific facts.

The paper states that there were in 1871 five explosions, each of which involved the loss of more than ten lives; this exceeds the number for the last 20 years, which is three. Three explosions, Messrs. SCOTT and GALLOWAY say, involving the loss of 58 lives, took place simultaneously with the firing of shots in mines in which safety lamps were used. In explanation of these phenomena, one of the writers has advanced the hypothesis that at the instant of the passage of an intense sound wave through a Davy or Clanny lamp, burning in an explosive mixture, the flame of the fire-damp is transmitted through the wire-gauze by the vibratory movement of the gases, and communicated to the surrounding atmosphere. The result of a number of experiments, which have been already made, seem to support this view, but the series of experiments has not yet been completed. The general observations to be made regarding the meteorological curves are thus described:—

1.—If the barometric curve, after having remained about the same height for

several days, descends ½ inch or 1 inch during the next two or three days, fire-damp may be expected in greater quantity than usual in cavities in the roof and in the higher parts of the workings, both during the descent of the curve, and for a day or two after it has reached its lowest limit; under these circumstances fire-damp may also be expected to appear in some places in which it had not been seen before.

2.—As the curve of temperature rises to 55° and upwards, the ventilating power should be increased at the same time; and the higher the temperature the greater is the necessity for such increase, in order to prevent a possible stagnation of the ventilating current

3.—If a sudden great fall of the barometer takes place (1 in. in 24 hours or so), or a further fall after it has been unusually low for a day or two, the utmost care will be necessary to guard against explosions and more especially if this phenomenon be accompanied by a rise of temperature. The first three and the last three months of the year are those in which the most violent barometric oscillations take place.

The writers entertain the very general opinion that the majority of explosions can be prevented by good ventilation. Fire-damp, they observe, would be almost unknown in many mines were a plentiful and unvarying supply of air introduced and properly distributed in the workings, and in others, which cannot be safely worked without the use of safety-lamps, it would be confined within the narrowest bounds. They propose hereafter to introduce an instrument for registering the ventilating power employed.—*London Mining Journal.*

On The Use of Steel for Boilers.

FROM a late number of the *Deutsche Industrie Zeitung* we learn that Mr. R. L. HASWEL, Engineer of the Austrian State Railway Company, spoke on this subject in the Society of Austrian Engineers. He remarked that the accidents which had occurred on railways using locomotive boilers of steel, had thus far been only ascribed to the material; yet this was due, on the one hand, to the preparatory working of the plates, and on the other, to the small thickness, as well as to the insufficient mode of assorting them before they were used. The State Railway thus far has used about 50,000 cwt. steel plates, among which only 200 cwt. were thrown aside during the manufacture of boilers.

HASWEL knows of only five instances where such boilers got cracks, four of which occurred in the fire-box plate and one in the cylindrical part. HASWEL ascribes their faulty condition to the fact that they were rolled when too warm. This shows that even by purchasing steel plates from the most renowned establishments and of the best quality, one cannot depend on their superiority for the purpose in question, without assorting them with the utmost care, because it can readily occur that in heating the plates one or more get spoiled. Hence, in the establishments of the State railway all plates are subjected to tests for their tensile strength, before they are used. That these tests are perfectly reliable is shown by the fact that of 350 boilers consisting of steel plate, only a single one was found torn thus far, and this in the cylindrical part. The box plates not having been tested, it is readily explained that four boilers were injured in those parts But, although these plates had undoubtedly been impaired in their strength by overheating, they would probably not have been torn if the construction of the machines, namely, the boiler supports, did not involve an immense strength.

In order to obtain steel boilers answering all requirements, only correspondingly thick plates and plates of the best material, without any addition (for otherwise the steel is not homogeneous) ought to be used; they ought to be scrupulously assorted according to their texture and tensile strength. After boring or punching they should be carefully annealed; the riveting must be performed with pedantic care, and the bending only with wooden hammers. That steel plates manufactured in Austria are of excellent quality, is proved by the manner in which boilers are there constructed. The box front plate, down cover, and the sides of the tubes are only furnished with an edge or border, while in England they are compelled to use angle iron for these connections.

Steel plates are preferable to iron plates, owing to the fact that they possess the same degree of elasticity in all directions (from 12 to 15 per cent.); in iron plates it is in the direction of the fibres, and according to KIRKALDY, about 15 per cent. If one proceeds in the manner indicated, says HASWEL, steel plates may be used with perfect safety. The boiler manufacturer has the advantage that he finds less plates to throw aside, and the railways on the other hand will have more carefully constructed, stronger and, in the end, cheaper boilers.—*Iron.*

The Pollution of Rivers by Mining.

THE Commissioners appointed by the British House of Commons to inquire into the sources of pollution of rivers, have made public, as their fifth report, the results of investigations into the pollution caused by mine waters and metallurgical works. In section A the causes of such pollution are pointed out, and in Section B the remedies are stated. In reference to the causes they have been divided into seven heads, viz., pollution by collieries and coal washing, iron mines, lead, zinc, copper, and arsenic mines, tin mines, manganese, baryta, and, lastly, pollution by china clay works.

According to the views of the Commission the first, second, fifth, and the seventh contribute nothing essentially dangerous to health of human beings, although probably offensive to cattle, &c., grazing on the banks of the streams into which such matters are thrown. The polluting matters seem to be generally in suspension, but rarely in solution, and the appearance of the water, thus polluted, has a sufficiently repulsive effect both on man and the lower animals to prevent, in most cases, a dangerous issue, of course excepting fish, who are rather particular in their article of diet when they have the chance of its selection; if not, they die.

Taking the first cause of pollution, collieries and coal washing, it appears that in most of the streams adjacent to large collieries contamination occurs from the coal-washing. This is chiefly due to the presence of a variable amount of sulphides of iron, in the form of pyrites, which, coming into contact with the water used in the washing process, becomes converted into sulphate of iron, or copperas, and the peroxide of the metal, the latter being of course innocuous. But, as we have already stated in preceding issues, the sulphate of iron has a highly beneficial effect in purifying waters contaminated with sewage matters, and the Commissioners consider it highly capable of freeing sewage water of its organic constituents. Hence, in fact, the essential portions of the patents of most of our chemical sewage-treating companies. Special cases with analyses are offered in this Report as confirmatory of this fact. The mechanical result of coal-washing, however, has an opposite effect. The suspended matter is enormous; fragments and even masses of shale and other detritus are carried down the stream, to the destruction of all agricultural produce on the adjacent banks, especially in time of floods, and occasionally causing the death of cattle. The Commissioners considered that the matter in suspension is the chief cause of such injurious effects, but occasionally the amount of arsenic is very prejudicial, from its presence in the pyrites in the coal.

Under the second head, pollution by iron mines may be briefly dismissed by the statement that, as the polluting material is usually a suspended form of sesquioxide of iron, its effects are simply of a mechanical character, and generally free from those due to chemical causes. Their chief complaint is that the oxide of iron leads to the silting up of rivers, if of small contents, or if the waste is in large quantities.

The pollution caused by lead, copper, zinc, and arsenic mines introduces us to the chemical injuries that might result from contamination of the streams. Lead ores, in the United Kingdom, are all but universally sulphides or galena, and the mode of extracting the metal by washing leads to a large amount of the highly comminuted ore being sent into the adjacent stream, and thus acting prejudicially to all places below its exit. We met with an instance of this kind some years ago, in which a large paper maker suffered seriously from this cause, the color of the manufactured article being very dull, owing to the presence of lead in the stream whence he derived his washing water. In the Report before us, the Commissioners instance the case of the "skimping" of a mine, in the Wear basin, containing galena to the extent of 6.83 per 100,000 parts, showing that no less than nearly 7 tons of lead ore, worth 12*l.* per ton, were wasted for every 100 tons of waste thrown into the stream. The waste, in its progress down the stream, causes great destruction of poultry and fish, beside injury to adjacent land. Of course, this prejudicial result is due to the peculiar method by which lead ores are treated to separate the matrix from the metallic sulphide. In some cases 10 per cent. of the mud, collected in slime pits below the works, consisted of lead ore, and, in exceptional cases, 25 per cent. was present in a slime pit a mile and a half from the upper works. This shows an enormous waste of material, and it does not seem uncommon, except in actual amount, which varies in other cases from 2 to 5 and 13 per cent. in the waste mud. In many cases cattle had been poisoned by the deposit of lead waste on fields adjoining the banks of streams. In these, however, the soluble matter was free from lead, the danger arising from the mechanical suspension of the galena. Instances are given in which the entire destruction of the agricultural value of the land resulted from this lead poisoning, especially in regard to the rivers and streams flowing into Cardigan Bay, at and above Aberystwith, and also in the Tyne near Hexham, in the upper reaches of the Tees and Wear, etc.

As a rule, the contamination of running streams by copper mines is but slight. The reason of this is that, as copper is a valuable metal, its diffusion in a soluble form is prevented by immersing in streams containing it masses of waste iron, which, by electro-chemical action, precipitate the copper in an almost pure form. It was only in regard to suspended matter that the effluent water of copper mines was polluting. The presence of arsenic, however, in some ores, was prejudicial. In one work, the Devon Great Consols, about from 165 to 200 tons of white arsenic are produced monthly from the ore, an amount sufficient to destroy the lives of half the estimated population of the globe, and a large quantity of the waste of the manufacture is cast daily into the adjacent river.

The treatment of tin ores in Cornwall leads to the pollution of running streams into which the waste is cast, but almost entirely through simple mechanical suspension, causing a loss similar to that we have noticed in regard to lead ores. The result is highly injurious to fish. In case of floods the waste of the tin-crushing is spread on the surface of adjacent lands, all of which might be prevented by settling pits, that would not only prevent the pollution of the streams, but also do away with a heavy loss now sustained by the owners of the mines. In some instances this source of loss is, by judicious management, almost entirely avoided. Generally, however, there was no evidence that the river pollutions due to mining industry in Cornwall were productive of injury to health. These effects were more notable in the destruction of the fertility of soil over which the waste had been spread in time of flood. The pollution of streams by manganese and baryta mines may be briefly dismissed on account of the limited area in which these occur in the United Kingdom. Baryta, however, being often associated with lead ores, especially galena, has been a source of poisoning to fowls kept near streams running from the mines. The pollution, if such it can be

$H_2S + 2H_2O = H_2SO_4 + H_2S$

called, arising from china clay works, is one entirely of suspension. The clay is of an exceedingly fine texture, and hence long remains suspended in a stream. But practically, like most other kinds of clay, it has a tendency to remove both "organic carbon" and "organic nitrogen." It is, in fact, an essential feature of more than one of the chemical schemes that have been patented for the purification of sewage.

So far we have given an analysis of the Report in respect only to pollution arising from the preparation of metals from their ores. In the second main section, however, a much more serious cause of pollution is dealt with, namely, that which is caused by *metal manufactures*. The investigations of the Commissioners in this respect are divided into six heads, namely, pollution arising from nickel works, iron works and rolling mills, the cutlery trade, iron and steel wire, and galvanising works, brass foundries, and lastly, German silver and electro-plate works. Of these the first, second, third, fifth, and sixth may be dismissed as practically of little importance. The most important cause of pollution to streams arises from the drainage of galvanising works, owing to the enormous quantity of waste material cast into the streams adjacent to the works, and the reckless and sudden manner in which such waste is got rid of. In regard to this fourth item it may be explained that iron and steel wire, tinplate (that is, iron subsequently to be tinned), and galvanised iron (that is, iron subsequently to be coated with zinc), all require the operation of "pickling" before the final stage of the manufacture. This pickling consists in the removal of the external oxide of the iron plate or wire by means of a solution of sulphuric or hydrochloric acid in water. The resulting products are sulphate or chloride of iron, according to which acid has been used for the purpose. As an effect of this we may mention our experience at Birmingham. At certain hours of the day the pickling liquid is thrown into the sewers. Standing at Saltley, where the sewage works are situated, it will be noticed that the sewage rapidly turns to a brownish-red color, owing to the alkalies in the sewage decomposing the iron salts of the pickle, first producing protoxide and hydrated carbonate of iron, which, by speedy oxidation, become converted into the red sesquioxide. The latter, being insoluble, is harmless, but the "pickle," through its acid character, destroys all the mortar of the sewers, and the immense sewage tanks at Saltley show the same effect, almost every course of brickwork leaking like the uncaulked seams in a ship's sides. The Report enters into details of such results as observed at Birmingham, Sheffield, and other places. In some districts the waste pickle is utilized, the sulphate of iron and the chloride being retained and made an article of commerce. But where such pickle is highly acid the effects are most injurious to the stream and on the adjacent land, and in some cases cause the evolution of gases prejudicial to human health. The abominable stench of the "manure" at Saltley, near Birmingham, if once smelt, will leave a lasting impression. In fact, no words can convey an idea of its offensive character.

From the preceding analysis it will be noticed that the pollutions arising from metals, and metal manufactures, are due respectively to mechanical and chemical causes. The Comissioners in their Report (Section B) suggest remedies for both evils. Without going into details of all the plans they suggest, it will be sufficient to state that the two chief methods are: the prevention of pollution by mechanically suspended matter through the use of adequate settling tanks; and the retention and utilization of the so-called waste chemical products at the works, converting such into articles of commerce, which in most cases would lead to great profit. It is remarkable how blind manufacturers frequently are to their own interests. When the Smoke Prevention and the Alkali Acts were passed some years ago, nothing but apparent ruin could be perceived by those against whom these acts were launched. In the end, however, the result was directly the reverse; indeed, some of the manufacturers have accumulated large fortunes by an observance of the provisions of such Acts. The Commissioners, in their Report, enter into a series of elaborate experiments they have made showing how the present pollution of streams by metals and their manufactures may thus be not only prevented, but also be made sources of profit. From long experience with the whole subject we heartily agree with what they state. The present waste of material, independent of any sanitary questions, is a disgrace to technical science; yet it takes place in districts supposed to possess the shrewdest men of business, and the most advanced culture of practical science in regard to engineering and chemistry.

In the final summary of the Report, the Commissioners draw attention to the localities in which the chief pollution of streams occur, and from facts already stated, deduce certain conclusions and recommendations, the latter being tabulated under ten heads. They deem the following to be polluting causes in any stream.

1. Any liquid retaining in suspension, after being at rest for six hours, more than one part by weight of dry organic matter in 100,000 parts by weight of the liquid; or if not having been so rested for subsidence, it should have in suspension more than three parts by weight of dry mineral matter, or one part of dry organic matter in 100,000.

2. Any liquid containing in *solution* more than two parts by weight of organic carbon, or 0.3 of organic nitrogen per 100,000.

3. Any liquid which shall exhibit by daylight a distinct color, when a stratum of 1 in. deep is placed in a white porcelain vessel.

4. Any liquid which contains in solution in 100,000 parts, more than two parts of any metal except calcium, magnesium, potassium and sodium.

5. Any liquid which contains in any form 0.05 per 100,000 of metallic arsenic.

6. Any liquid containing in 100,000 parts after acidification with sulphuric acid, more than one part of free chlorine.

7. Any liquid containing, as sulphide, or as sulphuretted hydrogen, more than one part of sulphur per 100,000. The next conditions relate to acidity and alkalinity. They recommend that not more than an acidity produced by two parts of hydro-chloric acid in 1000 parts of water; nor an alkalinity greater than that exhibited by the presence of one part per 1000 of caustic soda should be allowed; and lastly, that any liquid showing a film of petroleum on its surface, or containing in suspension more than 0,5 parts of such oil in 100,000 parts of water, should be deemed pollution.

Some of these provisions are already familiar as having occurred in previous reports on the sewage question. They have been considered much too stringent, and we think justly so. Perhaps they have done much harm in erecting too high a standard. But in concluding this brief analysis we must give the Commissioners the credit of having taken great care, and shown much impartiality in their investigations and conclusions. We advise all interested in the question to carefully study the Report, as sooner or later it must lead to legislative action, to stop the present evils of our metal manufactures, both sanitary and commercial.—*Engineering.*

Mining Matters.

MINERAL PRODUCE OF RUSSIA.

THE "Tableaux Statistiques de l'Industrie des Mines de la Russie en 1871," which were published by M. Skaljkowsky in connexion with the Vienna Exhibition, contain the following data with regard to Russian Mining industry: In 1871, the number of mines owned by Russia, and producing gold was 979, platinum 6, silver-lead 21, copper 76, iron 1174, zinc 6, cobalt 1, tin 1, coal 327, pyrites 1, chrome 6, rock salt 4, besides 697 naphta pits. Their yield was from 17 million tons of gold sand 86,400 lb. of gold, from 168,000 tons of platinum sand 4504 lb. of platinum, 35,120 tons of silver-lead ore, 100,365 tons of copper ore, 820,000 tons of iron ore, 42,400 tons of zinc ore, 10½ tons cobalt ore, 8000 tons pyrites, 817,000 tons of coal (black coal and brown coal), 22,000 tons of naphta, 7000 tons of chrome iron ore, and 455,000 tons of rock salt. The smelting works of Russia produced from these raw ores: silver, 29,000 lb.; lead, 1740 tons; copper, 4200, tin 8, spelter 27,000, pig iron 354,000, iron castings 30,000, wrought iron 241,500, steel 7000, copper sheets 350, and zinc sheets 500 tons, and material for 11,255,000 roubles. The works gave employment to 266,300 men.

MINING DECISION.

The Secretary of the Interior has decided the long-contested Utah mining case of the Eureka Mining Company vs. the Jenny Lind Mining Company and others, and held in accordance with the advice of Assistant Attorney General Smith: First, that in estimating the sixty days publication required by act of May 10, 1872, the first day of publication should be excluded and the last included. This reverses the ruling and practice of the General Land Office on a very important point; second, that the jurant to the adverse claim required by the fourth section of said act must be made by an attorney; third, that where several persons unite in an adverse claim, the jurant is sufficient if made by one of such persons; fourth, that the filing of an adverse claim with the Register of the local office is sufficient filing under said act; and, fifth, that the adverse claim of the Jenny Lind Mining Company does sufficiently set forth the nature of said claim. The decision, based on the foregoing conclusions of law, is to the effect that the Jenny Lind Mining Company is entitled to possession of the very valuable mine in controversy, as against the Eureka Mining Company and all other adverse claimants. This decision is, however, subject to reversal by the Courts, where the contest will now be renewed.

AUSTRALIAN TIN.

Australia is destined at no distant period to become a great tin-producing country. In the Koeting field the ore occurs as black, grey, yellow, and red or ruby tin, and is often coated with oxide of iron; small garnets are frequent, and specks of gold are occasionally met with. The ore contains an amount of tin varying from a few ounces to several pounds weight to the ton of stuff. Excellent prospects have been obtained over an extensive district in the Koeting field, and the development of tin deposits is looked forward to with confidence as likely to add materially to the industrial wealth of the colony. In the first nine months of the present year, ending September 30th, the imports of Australian tin into England have amounted to about 3,520 tons of ore, as against only 200 tons in the corresponding period of 1872. Such an immense increase in the Australian supply must, of course, greatly affect the state of the market; and it would have affected it more powerfully if the supply of the Straits and Cornish tin had not this year so largely decreased. The imports of Straits have been only 3,466 tons this year, as against 5,205 tons in the first nine months of last year, showing a diminished supply of 1,759 tons. There is also a falling off in the amount of Cornish tin produced this year, but not enough to balance the large supplies from Australia. Prices are down, because this increase comes just at the time when demand has fallen off. In the first nine months of this year the total deliveries from London and Holland of foreign tin, including Banca, Billinton, Straits, and Australian, have amounted to no more than 7,917 tons, as against 9,409 tons in the corresponding months of last year, showing a decrease in the deliveries of about 1,500 tons.

THE COAL TRADE

NEW YORK, Dec. 5, 1873.

The coal market has not had any change worthy of note during the past week, if we except the Pennsylvania Coal Co.'s circular, which puts the retail price of their coal down to $5.60 for grate and egg—$5.80 for stove and $5.00 for chestnut, per ton of 2000 lb. at the yard. It was thought that this action of the Pittston Company would possibly produce a break in the general market, but such has not been the case, the contractors who take all the Company's coal, holding the prices about the same as other dealers. In fact, *no reduction in the price of coal will take place before March.* Such is reported to be the agreement between the large companies, and while the Pittston Company is not in the combination, it has shown itself quite ready to profit by the strength of these lions of the trade, and since the late reduction in price has benefited a few contractors rather than the public, we see but little foundation for the congratulations of the daily press on the expected break in the price of anthracite.

Since it is decided that no reduction in the price of coal will be made before March or April, the large or small amount on hand is practically of little importance.

Orders are coming in more freely, and with the cold weather which we may expect to follow sharp on the unusually mild weather of the past three days, they will still further increase. Prices are well maintained, especially in the smaller sizes. With the larger sizes a concession of 20 to 25 cents is made by some dealers. Collections, though rather difficult,, show that the effect of the panic is rapidly disappearing and business is recovering its natural tone.

On the 26th of November the Lehigh Valley Railroad issued the following notice:—

"A general reduction of ten per cent. will be made upon all salaries and wages of officers and employees paid by this Company from December 1st, 1873."

In consequence of this step there is now a strike among the brakemen, and there are no coal trains moving. A telegram from one of the officers of the Company says it is impossible to tell for a few days yet whether the strike will be serious or not.

Labor Troubles in Pennsylvania.

POTTSVILLE, Dec. 4, 1873.

The Philadelphia and Reading Railroad gave notice that a reduction of ten per cent. on the wages of all their employees in the transportation department would be made on December 1.

A meeting of the train hands, composed of delegations from various sections of the country, was held at Mahanoy Plane to-day. Only a portion of the deliberations were made public. They would not accede to the demand of the company, preferring to remain idle.

At Shenandoah no settlement has been effected and several miners have been compelled to suspend work for want of cars, and but one freight train passed there on the Lehigh Valley road. Passenger trains are running as usual. The men are very determined.

No coal trains were run to Frackville to-day. Reports received from the towns in this region represent the employees as being very determined.

A large meeting was held at Tamaqua. It is not known what action was taken.

At Palo Alto it was reported to-day that the men were discharged who run between Philadelphia and Pottsville, having refused to take strikers' places on the branch roads running to the mines.

The miners in the vicinity of Ashland and Girardville are also on strike, in consequence of being put on three-fourth time on and after December 1.

Bituminous Coal Trade, 1872 and 1873.

The following table exhibits the quantity of Bituminous Coal passing over the following routes of Transportation for the week ending Nov. 29, 1873, compared with week ending Nov. 30, 1872.

COMPANIES.	1872. Week.	1872. Year.	1873. Week.	1873. Year.
C. & O. Canal	6,041	612,169	10,919	635,669
B. & O. R. R.	27,704	1,171,794	27,306	1,386,426
Penn. S. Line	2,560	10,158	3,031	101,883
H. & B. T. R. R.	7,243	276,858	10,553	426,401
*Harrisburg & D.	4,970	438,838	6,567	313,985
*L. V. R. R.	376	27,060	178	28,026
P. & N.Y.C. & R. Co.	5,777	337,192	6,815	294,668
Cumberl'd Branch Canal.	2,780	202,865	3,432	136,475
" Railroad	247	21,890	1,635	81,616
Total	57,703	3,098,924	70,436	3,405,349
	....		57,703	3,098,924
Decrease	....			
Increase	....		12,733	306,525

Lykens Valley Coal Company.

Shipments of coal from Lykens Valley Coal Co., for week ending Nov. 2, 1873.

For week ending Nov. 22, 1873	358 16
Total shipment to date	.....

Anthracite Coal Trade for 1872 and 1873.

The following table exhibits the quantity of Anthracite Coal passing over the following routes of transportation for the week ending Nov. 29, 1873, compared with the week ending Nov. 30, 1872.

COMPANIES.	1872. WEEK.	1872. TOTAL.	1873. WEEK.	1873. TOTAL.
Phila & Reading R. R†	66,576	4,300,626	115,118	4,762,539
†Schuylkill Canal	20,085	832,943	22,495	743,796
†Lehigh Valley R. R.	39,227	3,009,396	49,275	3,139,024
Lehigh & Sus. R. R.	24,313	1,560,268	41,023	1,866,930
" " Canal	12,435	764,347	10,643	755,680
Scranton North	18,235	744,249	15,292	878,158
" South	24,407	1,891,858	42 378	1,981,788
Penn. Coal Co., rail	21,480	1,124,867	24,709	1,144,439
" " " canal	....	6,241	....	7,927
Del. Hud C. Co. Canal	24,948	1,394,041	....	1,358,652
" " East	7,795	487,135	10,350	387,786
" " West	10,704	397,956	8,665	542,796
" " South	5,886	7,357,333	699	168,276
Shamokin	12,086	538,064	9,115	555,398
Trevorton	....	....	....	....
Lykens Valley Coal Co.	....	....	....	....
Wyoming North	....	....	....	....
Wyoming South	....	....	....	....
P. N. Y. C. & R. R. Co.	8,145	580,983	10,720	685,374
Williamstown Col'y	....	.....	....	....
Big Lick Col	....	.....	....	....
Total	293,331	17,992,329	360,552	18,999.643
1872			293,331	17,992,329
Increase			67,221	1,006,314
Decrease				

These figures are for the week and fiscal period commencing Nov. 30

† Less coal transported for Company's use and Bituminous coal.

Report of Coal Transported over the Lehigh Canal

For the week ending Nov. 28, 1873.

REGIONS SHIPPED FROM.	TIDE. tons, ct.	LOCAL. tons, ct.	TL. WEEK tons cwt.	TL. DATE tons, cwt.
Mauch Chunk Region	102 12	362 06	464 18	206447 19
Mauch Chunk Region Hazardville	589 10	753 02	1,342 12	28,845 16
Beaver Meadow Region	293 00	1066 19	1,359 19	131,534 15
Mahanoy Region		871 14	871 14	20,694 01
Hazleton Region	289 10	3,615 05	3,904 15	199,813 02
Upper Lehigh Region		570 05	570 05	29,812 04
Wyoming Region	1376 15	751 04	2,128 19	114,259 07
Wyoming Region, Hazardville				4,282 09
Total	2651 07	7991 15	10,643 02	735.679 13
Previously reported	257463 05	467568 06	725,038 11	
Total to date	260119 12	475560 01	735,679 13	
Corresponding week last year	287177 09	479170 01	766,347 10	
Increase				
Decrease	27057 17	3610 00	30,667 17	

DISTRIBUTION.	WEEK 1873.	WEEK 1872.	YEAR. 1873.	YEAR. 1872.
Consumed on line of Lehigh Canal	2,503 00	3,317 14	81,110 00	80,903 13
Passed into Morris Canal to Tidal Points			2,613 17	5,081 05
Passed into Morris Canal to Local Points		148 15	28,233 05	23,519 17
Passed into Del. & Rar. Canal to Tidal Points	2,651 07	2,418 01	257,605 15	282,096 04
Passed into Del. & Rar. Canal to Local Points	191 00	474 09	13,566 01	14,802 15
Consumed on line Delaware Div. Canal	385 06	1,102 08	39,661 11	47,445 09
Passed turough to Bristol	4,912 09	4,974 01	312,889 04	312,498 07
	10,643 02	12,435 08	735,679 13	766,347 10

Statement of Coal Transported over Cumberland and Pennsylvania Railroad

During the week ending Saturday Nov. 29, and during the year 1873, compared with the corresponding period of 1872.

WEEK.

	C. & O. C'l Tons. Cwt.	B. & O. R. R. Tons. Cwt.	Pa. S. Line Tons. Cwt.	Total. Tons. Cwt.
1873	10,918 19	27,306 04	3,031 04	41,256 07
1872	6, 41 08	27,704 12	2,560 19	36,305 19
Increase	4,877 11	.....	471 05	4,950 08
Decrease		398 08	....	

YEAR.

1873	635,669 09	1386426 05	101,882 18	2,123,978 12
1872	612,169 10	1171794 04	10,158 09	1,174,122 03
Increase	23,499 19	214632 01	91,724 09	327,855 09
Decrease	....	....	....	....

Cumberland Branch R. R.

WEEK.

	To C. & O. Canal. Tons. Cwt.	To B. & O. R. R. Co. Tons. Cwt.	Total. Tons. Cwt.
1873	3,431 16	1,634 18	5,066 14
1872	2,780 03	247 01	3,027 04
Increase	651 13	1,387 17	2,039 10
Decrease		.....	.....

YEAR.

1873	136,474 18	81,616 09	218,091 07
1872	202,865 02	21,890 11	224,755 13
Increase		59,725 18	
Decrease	66,390 04		6,664 06

Delaware Lackawanna & Western Rail Road Company.

Coal transported on the Delaware, Lackawanna, & Western Railroad for the week ending Saturday, Nov. 29, 1873.

	WEEK. Tons. Cwt.	YEAR. Tons. Cwt.
Shipped North	15,291 12	878,157 10
Shipped South	42,378 00	1,981,788 06
Total	57,669 12	2,859,946 02
For the Corresponding time last Year:		
Shipped North	15,235 12	744,248 17
Shipped South	24,407 03	1,891,857 12
Total	39,642 15	2,636,106 09
Increase	18,026 17	223,839 13
Decrease		

Philadelphia & Reading Railroad and Branches.

COAL TONNAGE

For the Week ending Saturday, Nov. 29, 1873.

BY RAILROAD.—ANTHRACITE.

PASSING OVER MAIN LINE AND LEB. VAL. BRANCH.

	Tons. Cwt.
From St. Clair	38,874 18
" Port Carbon	5,477 15
" Pottsville	4,053 14
" Schuylkill Haven	44,016 07
" Pine Grove	6,859 15
" Tamaqua	11,318 16
" Harrisburg	....
" Dauphin	4,566 11
Total	115,117 16

FOR SHIPMENT BY CANAL.

Passing Frackville Scales	6,873 17
" Mill Creek "	409 17
" Schuylkill Valley Scales	115 15
" Mt. Carbon	1,154 14
" Oreesona "	7,374 14
" Pine Grove "	....
" Tamaqua "	1,390 08
Total	17,319 07

SHIPPED WESTWARD VIA CATAWISSA AND WILLIAMSPORT BRANCH AND NORTHERN CENTRAL RAILROAD.

Via Catawissa & Williamsport Br.	166 03
" N. C. R. R. passing Locust Gap	266 17
" " " Shamokin	3,561 12
" " " Herndon	....
Total	3,994 12

SHIPPED WEST OR SOUTH FROM PINE GROVE

Via Schuylkill & Susquehanna R. R.	1,699 02
" Lebanon & Pine Grove Branch	1,111 10
Total	2,810 12

CONSUMED ON LATERALS.

From Frackville Scales	964 16
" Mill Creek "	401 19
" Schuylkill Valley Scales	492 16
" Mt. Carbon "	1,149 04
" Oreesona "	243 19
" Pine Grove "	291 03
" Tamaqua "	554 01
Total	4,097 18

LEHIGH AND WYOMING COAL.

Received via Silverbrook Junction, Sent East	7,650 15
Cat. & Wpt. Br. Sent West	....
" " Rupert, Cat. & Wpt. Br.	23 11
" " Allentown R. Penn's Br.	104 09
" " Alburtis, "	5 05
" " Oreland, G. & N. Br.	433 06
" " Willow Street R. R.	555 00
Total	8,772 06

BITUMINOUS.

From Harrisburg	6,557 09
" Connecting R. R., G. & N. Br.	....
" Junction R. R.	10 00
Total	6,567 09

COAL FOR COMPANY'S USE.

Anthracite	8,257 07
Bituminous	563 08
Total	8,820 15

RECAPITULATION.

	Total for Week.	Corres'p'g week last year.	Increase and Decrease.
Passing over Main Line and Leb. Val. Branch	115.117 16	66,576 04	i 43,541 12
For Shipment by Canal	17,319 07	17,815 11	d 496 04
Shipped Westward via Northern Central R. R.	3,994 12	9,831 04	d 5,836 12
Shipped West or South from Pine Grove	2,810 12	1,618 09	i 1,192 03
Consumed on Laterals	4,667 18	4,041 09	d 626 09
Lehigh and Wyoming Coal	8,772 06	3,792 17	i 4,979 15
Total Anthracite paying freig't	157,682 11	103,675 08	i 49,007 03
Bituminous	6,567 09	4,969 19	i 1,197 10
Total of all kinds paying freig't	159,236 00	108,645 07	i 51,604 13
Coal for Company's use	8,820 15	7,986 05	i 834 10
Total Tonnage for Week	168,070 15	116,631 12	i 51,439 03
Previously this year	6378462 13	6068802 04	i 309,660 09
Total to date	6546553 08	6185433 16	i 361,119 12

SHIPPED BY CANAL.

From Schuylkill Haven	20,914 00	17,663 00	i 3,251 00
" Port Clinton	1,581 00	528 00	i 1,053 00
Total Tonnage per Week	22,495 00	18,191 00	i 4,304 00
Previously this year	721 301 07	819,999 10	d 98,698 03
Total to date	743,796 07	838,190 10	d 94,394 03

Report of Coal Transported over Central R.R. of N. J. (Lehigh and Susq. Div.)

Week ending Nov. 29—Compared with same time last year.

REGION SHIPPED FROM.	TIDE. tons ct.	LOCAL. tons ct.	CANAL. tons ct.	TL WEEK tons cwt.	TL. DATE tons. cwt.
Wyoming	24868 07	7241 11	538 04	32648 02	1692314 09
Upper Lehigh		3121 19	389 16	3511 15	181881 12
Beaver Meadow		2442 00	57 16	8144 09	3062 3 18
Hazleton	6044 13	289 15	3521 18	3811 13	204131 07
Mauca Chunk		5063 12	598 18	5662 10	491997 06
Total	30913 00	18458 17	5063 12	54436 09	2849131 12
Prev'ly reported	1333711 04	850476 07	610505 12	2794693 03	
Total to date	1364624 04	868935 04	615572 04	2849131 12	
Same time 1872	1077498 14	608827 00	488805 15	2274731 09	
Increase	287125 10	60108 04	126966 09	474400 03	
Decrease					

DISTRIBUTION.	WEEK 1873.	WEEK 1872.	YEAR 1873	YEAR 1872.
Forwarded East by Rail to Tidal points	20913 00	13818 08	1364624 04	1077496 14
Forwarded East by Rail to Local points	8451 19	8915 03	408737 19	402182 01
Forwarded East by Rail use Central Division	1930 08	1368 19	82708 01	72419 14
Forwarded East by Rail use L. & S.	197 12	210 05	10919 14	8187 17
Delivered at and above Mauch Chunk	1553 04	1425 08	57439 05	55520.16
Delivered at Coalport & Hazard for Canal	7649 03	4818 12	652241 19	531510 19
Delivered to L. V. R. R. at Packerton	352 09	119 13	21281 08	13673 19
Delivered to L. V. R. Rd. at Sugar Notch	3249 10		93817 19	
Delivered to L. & B. R. at Plymouth Bridge	141 04	4828 06	137361 06	212837 09
Total	54436 09	35504 14	2849131 12	2274731 09

Report of Coal Transported over Lehigh Valley Railroad

Report of coal tonnage for the week ending Nov. 29, 1873, with Totals to date, compared with same time last year.

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	TOTAL Tons. Cwt.
Total Wyoming	19,053 15	881,628 13
" Hazleton	19,091 12	2,123,657 17
" Upper Lehigh	53 16	2,974 15
" Beaver Meadow	7,719 14	629,570 15
" Mahanoy	13,870 02	503,892 02
" Mauch Chunk	53 18	3,265 13
Total	69,892 17	4,144,319 18
Same time last year	49,366 14	3,850,118 09
Increase	20,436 03	294,221 09
Decrease	.....	.....
Forwarded East from Mauch Chunk by rail	49,275 02	3,139,023 14
Same time last year	39,236 16	3,009,395 11
Increase	10,038 06	129,6.8 03
Decrease	.....	.....
DISTRIBUTED AS FOLLOWS.		
Local East of Mauch Chunk	1,814 10	78,959 09
Forwarded East for use L. V. R.	526 12	51,517 13
Delivered to Furnaces and Manufacturing Companies	6,350 01	653,552 02
Delivered to Cat. & Fog. R. R.	124 10	7,414 08
" " East Penn R. R.	124 04	8,754 06
" " North Pennsylvania Railroad	5,012 09	307,830 01
" " Port Del.	214 06	206,957 11
" " East Amboy Railroad	.....	.....
" " Morris and Essex Railroad	4,598 13	269,651 06
" " Bel. Del. Railroad	19,916 04	1,038,564 05
" " Central Railroad	10,605 13	515,822 11
Delivered at and above Mauch Chunk for use of L. V. R. R.	1,795 18	68,159 04
To P. & N. Y. R. R.	9,836 08	485,184 02
To Northern Central R. R.	1,771 17	24,929 08
To D. H. & W. R. R.	325 18	31,453 16
To L. & S. R. R. at Packerton for rail	849 06	14,222 19
To Individuals at Mauch Chunk	145 02	2,731 18
To Individuals above Mauch Chunk	545 13	16,873 13
To L. & S. R. R., at Penn Har., for railroad	.....	1,541 10
Do. for canal	3,511 18	192,658 14
To Lehigh Canal Mauch Chunk	2,245 15	81,700 15
To Catawissa Railroad	30 00	140 00
To L. & B. R.R. at Lack. Junc.	.....	85,710 05
Total	69,892 17	4,144,319 18

Penn. and N. Y. R. R.—Coxton, Pa.

Coal tonnage for week ending Nov. 29, 1873.

	Week. Tons. Cwt.	Total. Tons. Cwt.
Anthracite received :		
From Lehigh Valley R. R.	9,836 08	485,184 02
" Lack. & B. R. R.	113 08	36,959 19
" Pleasant Valley R. R.	96 08	128,061 16
" Sul. & Erie R. R.	675 15	35,267 18
Total	10,720 19	685,373 15
Same time last year	8,144 16	580,937 16
Increase	2,576 03	104,435 19
Decrease	.....	.....
Distributed :		
To Lehigh Valley R. R.		24,004 13
To Lack. & B. R. R.		1,443 0.
To S. Central R. R.	2,264 06	155,192 18
To Ithaca & A. R. R.	4,225 17	145,448 16
To Erie R. W. Pockets for shipm't.	2,710 10	242,383 06
To Erie Railway, Watkins direct	592 12	12,280 10
To individuals on line of road	842 05	30,776 10
To points at & above Coxton for use of Co.	526 05	26,027 14
To points between Waverley and Elmira	559 04	46,816 03
Total	10,720 19	685,373 15
Bituminous received from BARCLAY R. R.		
Shipped north from Towanda	6,757 14	292,376 15
Shipped south from Towanda	57 09	2,107 01
Northern Central R. R.	....	384 09
Total	6,815 03	294,868 05
Same time last year	5,777 07	337,191 15
Increase	1,037 16	.....
Decrease	.....	42,323 10
Distributed :		
To Erie Railway	6,398 15	269,201 02
To So. Central R. R.	358 19	22,557 10
To Ithaca Valley R. R.	....	548 18
Lehigh Valley, R. R.	44 19	1,179 19
To individuals on line of Railroad.	12 10	1,262 12
To points on line of road for use of Company	....	118 04
Total	6,815 03	294,868 05
Grand totals transported :		
Anthracite	10,720 19	685,373 15
Bituminous	6,815 03	294,868 05
Total	17,536 02	980,242 00
Same time last year	13,922 03	918,129 11
Increase	3,613 19	62,112 09
Decrease	.....	.....

Pennsylvania Coal Company.

Shipments of Pittston Coal for the week ending Nov. 29, 1873.

	1873. WEEK.	1873. YEAR.	1872. WEEK.	1872. YEAR.
By Railway	24,709 01	1,144,438 15	21,480 07	1,124,866 16
" Canal	.....	7,927 11	.....	6,240 18
Total	24,709 01	1,152,366 06	21,480 07	1,131,107 14
Increase, 1873	21,256 12			

Northern Central Railway, Shamokin Division.

Below is the return of Coal sent over the Shamokin Division of the N. C. R. W., for the 7 days ending Nov. 28, 1873.

	Tons. Cwt.	Tons. Cwt.
East	1,616 05	
West	7,488 15	9,115 00
Same time last year		12,085 18
Increase		
Decrease		2,960 18
Total amount shipped to date		595,398 03
Same time last year		538,064 10
Increase		67,333 13
Decrease		

Delaware and Hudson Canal Company.

Coal mined and forwarded by the Delaware and Hudson Canal Company for the week ending Saturday, Nov. 29, 1873.

	WEEK.	SEASON.
North	20,503 01	2,45',592 06
South	698 11	168,275 11
Total 1873	21,201 12	2,619,867 19
Corresponding time in 1872 :		
North	48,722 05	2,353,723 17
South	5,885 08	357,333 04
Total, 1872	54,607 13	2,711,057 01
Increase North		
Decrease North		
Increase South		
Decrease South		
Increase		91,189 02
Decrease		.....

Delaware and Hudson Canal Company.

Coal mined and forwarded by the Delaware and Hudson Canal Company for the week ending Saturday, Nov. 29, 1873.

	WEEK.	SEASON.
By Delaware and Hudson Canal	.....	1,358,652
By Railroad, East	16,350	587,786
" West	8,665	542,706
" South	699	168,276
Total 1873	19,.14	2,457,510
Corresponding time in 1872 :		
By Delaware and Hudson Canal	24,948	1,394,041
By Railroad, East	7,795	487,136
" West	10,704	397,958
" South	5 885	357,333
Total	49,332	2,636,467
Decrease	178,957	

Prices of Coal by the Cargo.

[CORRECTED WEEKLY.]

Company Coals.

Dec. 1873.

	L.	Str.	Ora.	Eg.	Sto.	Chest
*Pittston at Newburgh	4 60	4 60	4 70	4 80	5 10	4 50
*Lackawana at Rondout	5 05	5 15	5 25	5 40	5 70	5 05
Wilk'b're at Pt. John'n	5 05	5 15	5 25	5 40	5 70	5 05
Old Co. Lehigh at Pt. John'n	5 00	5 85	5 85	5 95	5 20	—
New York Coal Exchange	5 85	5 70	5 70	5 85	5 15	—
AT PHILADELPHIA.						
Hard White Ash	4 60	4 60	4 70	4 70	5 00	3 95
Free B'rn'g White Ash Coal	4 60	4 60	4 70	4 70	5 00	3 65
Schulkill Red Ash	—	—	4 70	4 85	5 15	3 95
Alaska Red Ash	—	—	4 70	4 70	5 00	3 95
Shamokin White Ash	—	—	4 80	5 00	5 20	4 10
North Franklin	—	—	5 20	5 20	5 10	4 00
Lorberry	—	—	5 50	5 50	5 50	4 35
Lykens Valley	—	—	—	6 10	6 10	4 75
SHIPPED FROM ELIZABETHPORT, HOBOKEN AND TRENTON.						
L. C. and N. Co., Newport	—	—	5 35	5 50	5 70	5 10
" " Plymouth Red Ash	—	—	5 35	5 60	5 80	5 10
" " Room Run	5 85	—	5 70	5 70	5 95	5 20
Honeybrook Lehigh	5 90	—	5 80	5 85	5 90	5 20
Fulton, "	6 00	—	5 85	5 85	5 95	5 20
Scranton	4 85	5 10	5 20	5 55	5 65	5 60

For freights to different points see "Freights."

*To contractors only.

Prices at Baltimore—Dec. 1873.

Wholesale Prices to Trade.

Wilkesbarre, by cargo or car load	$5 05@5 70
Pittston and Plymouth, do	75@6 00
Shamokin Red or White Ash, do	00@6 25
*Lykens Valley Red Ash, do	@6 80
By retail, all kinds per ton of 2,240 lbs	7 50@8 50
*George's Creek and Cumberland f. o. b. at Locust Point for cargoes	4 85@5 00
West Va. Gas Coal	6 50
Youghigheny gas f. o. b. at L. Point, nominal	7 50
Kanawha Canuel, coarse	@12 50

* Freight to New York $2 15.

BITUMINOUS COALS.

Kittaning Coal Co.'s Phœnix Vein, f. o. b. at Phila	$
Lemon " " "	
Cumberland Vein Coal	
Tyreonnel f. o. b.	$7 00

Prices at Georgetown, D.C., and Alexandria, Va.

Dec. 1873.

George's Creek and Cumberland f. o. b. for shipping $4 60@4 75

Prices at Havre de Grace, Md.

Dec. 1873.

Wilkesbarre and other White Ash for Cargoes	$— —@5 00
Lykens Valley	— —@6 50
Shamokin Red or White Ash	— —@5 25

Bituminous Coals (Cumberland).

Georgetown, F.o.b	$4 60
Baltimore "	5 00
New York "	7 25@7 50
South Amboy "	6 80

Prices of Foreign Coals.

Dec. 1873.

Duty 75 c. per ton.

Corrected weekly by ALFRED FARMELE, No. 32 Pine street, N. Y.

Liverpool Gas Caking	16 00@18 00
" Cannel	13 00@18 00
" House "	20 00@21 00
" Orrel	20 00@— —

Per ton 2,240 lbs., ex-ship.

PRICES FROM YARD.

Liverpool House Orrel, screened	$20 00@22 00
" Cannel, "	22 00@25 00

Per ton 2,000 lbs. delivered.

Prices of Gas Coals.

Dec. 1873.

PROVINCIAL.

Corrected weekly by Louis J. Belloni, Jr., 41-43 Pine st., N. Y

	Coarse	Slack
Block House, f. o. b. at Cow Bay	$2 75	$1 25
Gowrie	2 25	0 00

Corrected by Bird, Perkins & Job, 27 South street.

	Coarse.	Culm of Coal,
Pictou nett	$3 00	1 50
Sydney	3 25	1 00
Lingan	2 75	1 00
Caledonia	2 75	1 25

A discount from the prices of the coarse Coal on purchase of 5000 tons and upwards. Duty on all slack coal or Culm; 40c. per ton of 28 bushels, 80 pounds to the bushel. On all bituminous coal or shale: 75 cents per ton of 28 bushels.

AMERICAN.

	Nominal qu	Currency
Westmoreland f. o. b.	$9 00	@7 0
Fairmount Gas Coal Co. of N. Y	6 50	@7 00
Despard Coal Co	6 50	@7 00
Penn	6 50	@7 00
Newburg Orrel Gas	6 50	@7 00
West Fairmount Gas Coal	6 50	@7 00
Redbank Cannel, at Pa	12 00	@0 00
AT PHILADELPHIA		
Westmoreland	7 50	@8 00

Rates of Transportation to Tide Water.

BY RAILROAD.

TO PORT RICHMOND, PHILADELPHIA.

Philadelphia and Reading Railroad, from Schuylkill Haven	
Lump and St., net, $1 60; Br., Egg and Ch., $1 65; Stove, $1 75	
Shipping at Pt. R., 20c., for use at Phil., $2 15 from Pt. Carbon.	
MAUCH CHUNK TO ELIZABETHPORT.	
L. V. Railroad from Mauch Chunk to Phillipsburgh	$0 72
C. R. R., N. J., Phillipsburgh to Elizabethport	06
Shipping expenses at Elizabethport	25
Wharfage	10
Total	$2 23
MAUCH CHUNK TO PORT JOHNSTON.	
L. V. R.R., or L. & S. R.R. from M. C. to Phillipsb'g	$0 72
C. R. R., of N. J., Phillipsburgh to Pt. Johnson	1 06
Shipping expenses	25
Wharfage	10
Total	$2 23
TO HOBOKEN	
L. V. R. R., Mauch Chunk to Phillipsburgh	72
Morris & Essex R. R. Phillipsburgh to Hoboken	6
Shipping expenses	25
Wharfage	00
Total	$2 23
TO SOUTH AMBOY.	
L. V. R. R.	..
B. & D. R. R.	$1
Cam. & Am. R. R.	
Shipping Expenses	35
Total	$2 23
PENN HAVEN TO ELIZABETHPORT.	
L. V. R. R. Penn Haven to Phillipsburgh	84
C. RR. of N. J. Phillipsburgh to Elizabethport	1 06
Shipping expenses	15
Wharfage	20
Total	$2 25

Freights.—Dec. 1873.

	Cumberland. From Georgetown.	Cumberland. From Baltimore.	Anthracite. From Elizabethport, Port Johnston, Weehawken, and Hoboken.	Anthracite. From Newburgh.	Anthracite. From Rondout.
TO EASTERN PORTS.					
Amesbury	—	—	2 75	—	—
Bangor	—	—	2 75	—	—
Bath	—	2 75	2 50	—	—
Boston	—	2 50	2 15*	2 15	—
Bridgeport	—	2 25	90	90	—
Bristol	—	—	1 30	1 30	—
Chassett Narrows	—	—	—	—	—
Derby	—	—	1 25†	1 25	—
Dighton	—	—	—	—	—
East Cambridge	—	—	2 15	2 15	—
Fall River	—	2 25	1 25	1 25	—
Hackensack	—	—	—	—	—
Hartford	—	—	Ice.	—	—
Hoboken	—	—	45	45	—
Jersey City	—	—	45	45	—
Lynn	—	—	—	—	—
Middletown	—	—	1 25	1 25	—
Mystic	—	—	1 25	1 25	—
New Bedford	—	2 30	1 30	1 30	—
Newburyport	—	2 75	2 30	2 30	—
New Haven	—	2 25	90	90	—
New London	—	—	1 10	1 10	—
Newport	—	—	1 25	1 25	—
New York	—	1 90	45	45	—
Norwalk	—	—	90	90	—
Norwich	—	—	1 20	1 20	—
Pawtucket	—	—	1 35‡	1 35*	—
Portland	—	2 50	2 10	2 10	—
Portsmouth, N. H	—	2 70	2 30	2 30	—
Providence	—	2 25	1 75	1 25	—
Rockport	—	—	—	—	—
Saco	—	—	—	—	—
Sag Harbor	—	—	1 10	1 10	—
Salem	—	2 50	2 15	2 15	—
Stamford	—	—	90	90	—
Stonington	—	—	1 20	1 20	—
Taunton	—	—	1 75	1 75	—
Warren	—	—	1 25	1 25	—
TO RIVER PORTS					
Albany	—	—			
Catskill					
Cockeackie					
Coeyman's					
Cold Spring	—				
Fishkill					
Haverstraw					
Hudson	—				
New York vessels					
Nyack					
Poughkeepsie					
Rhinebeck					
Rondout					
Sangerties					
Sing Sing					
Stuyvesant					
Tarrytown					
Troy	—				
West Point					
Yonkers					

Canal closed for the Season.

† 3 c. per bridge per ton in addition to freight.
† New Haven rate and towing 25 c. extra per ton
‡ Towing from Providence and return, extra,
‖ And Towing.

St. Thomas	$— — Gold
Martinique	— — "
Demerara	— — "
New Orleans	— — "
Mobile	— — "

Foreign and Provincial Freight

Nov. 1873.

Foreign.

Newcastle and Ports on Tyne, per keel of 21 1-5 tons £
Liverpool, 5 per cent primage

TO NEW YORK.

Provincial

Sydney	
Lingan	$5 00
Cow Bay	4 00
Port Caledonia	4 00
Little Glace Bay	4 00
TO BOSTON.	
Sydney	4 00
Lingan	3 50
Cow Bay	3 50
Port Caledonia	3 50
Little Glace Bay	3 50
TO MONTREAL.	
Caledonia	3 75 gold
TO CUBA.	
Caledonia	9 50 gold

MARKET REVIEW.

NEW YORK, Dec. 4 1873.

IRON—The market for Scotch Pig is without special activity. There is some disposition to buy at low figures to hold for a better market, but holders, who have but light stocks on hand, are unwilling to sell, except for cash at full asking prices. The only sale is 50 tons Coltness at a private price. The unsettled state of American Pig, as noted in our previous issues, is still in full force. The demand is slow, and stocks accumulate. Buyers are almost out of the market, except, at very low prices for cash. Our quotations are to a great extent nominal, while we understand, they have been shaded to some purchasers; 50 tons No. 1 Allentown sold at $32, and 1000 do. Gray Forge are reported at $22,50@$23, and several other large parcels have been moved at low figures, particulars of which are withheld for the present. In absence of sales, we quote new English Rails $60 gold, American $65 currency, old T $35, while D. H. are nominal, there being none offering. Scrap is quiet at $35@$38 from yard, and $30 from dock. Refined Bar from store is very dull, and little business is looked for till the Spring trade opens—prices are nominally as before. Swedes Bar, which has been very scarce, is in better supply, including Plow sizes, 6 7 and 8-inch by ¼@½-inch—we quote ordinary sizes $163,50, and Plow sizes $172,50 currency.

Import of Iron into New York, from Jan. 1 to Nov. 30. 1873—

	Bar.	Pig.	Sheet, &c.
From Foreign Ports..	tons.9,463	tons.56,371	bdls.152,812
Coastwise.....	1,810	333	10,926
Total.....	tons. 11,273	tons.56,704	bdls.183,738
Same time, 1872..	16,110	93,832	264,930

LEAD—Pig is without movement; Ordinary Foreign is held at 6½@7 cents, and Domestic 6@6¼ gold; the European markets are quoted firm. Bar 9¼ cents, Sheet and Pipe 10½, and Tin Lined Pipe 16½, less 10 per cent. to the Trade.

Import of Lead into New York from Jan. 1 to Nov. 30, 1872—

From Foreign Ports	pigs,260,008
Coastwise Ports	43,309
Total	pigs,303,317
Same time, 1872	431,484

COPPER—The manufacturers of Copper and Yellow Metal are quiet, but there is a steadier feeling, in sympathy with the considerable rise in Ingot. The market for Ingot has been active, and the business has been very large, partly on speculation, at an advance of 1@1½ cents per lb. The sales embrace 2,500,000 lb. Lake, present and forward deliveries, on private terms; and subsequently, about 3@4,000,000 lb. for Janurry to March delivery, at 24@25 cents (for December, 24½@25), includ- 400,000 lb. Quincy, and 800,000 lb. Lake, later on at 24@25; and 100,000 lb. Lake, to a Dealer, 24½, cash; also, several lots of Baltimore at 24, cash. At the close 25 cents was asked for cash lots of Lake, and 26 for futures.

SPELTER—Remains dull, and our quotations are nominal. Prices are firm in Europe. Half a million lbs. of Foreign Spelter have been imported in the United States this year.

REGULUS ANTIMONY—We note a sale of 5 casks at 12½ cents, generally held 13 cents gold.

STEEL—Continues quiet, at about our quotations, for both Domestic and Foreign.

ZINC—Mosselmann Sheet continues quiet at our quotations, with nothing doing from agents' hands. Manganese black oxide 3½ cts. currency, Manganese gray peroxide 6 cts currency.

Messrs. BIGELOW and JOHNSTON, No. 48 Pine street, review the market for the month of November as follows:

NEW RAILS.

IRON.—Foreign, $58@60 gold; *American, $63@65 currency; import at New York this month, none; previously since January 1, 41,449 tons; total to date, 41,449 tons; † same time, 1872, 186,084 tons; same time, 1871, 200,123 tons.

STEEL.—Foreign, $169@112 gold; American, $110@120 currency; import at New York this month, 7,187 tons; previously since January 1, 80,574 tons; total to date, 87,761 tons.

OLD RAILS.

Double Heads, nominally; T or Flange, $35@40 currency; U or Bridge, nominally; import at New York this month, 139 tons; previously since January 1, 9,948 tons; total to date, 10,087 tons; same time, 1872, 58,252 tons; same time, 1871, 57,017 tons.

SCRAP IRON.

No. 1 Wrought, $35@40.

PIG IRON.

American Forge, $20@24 currency; No. 1 Foundry, $30@32 currency; No. 2 Foundry, $26@28 currency; Scotch No. 1 Foundry, $37@43 currency; import of Foreign this month, 374 tons; previously since January 1, 56,461 tons; total to date, 56 835 tons; same time, 1872, 88 091 tons; same time, 1871, 78,559 tons.

REMARKS.

NEW RAILS—With the disappearance of the more aggravated features of the panic, a more cheerful feeling has supervened, but too late to influence transactions in railroad iron. The market remains inanimate, although some very cheap lots of English Rails are offered for cash. It is not to be expected that any business of importance in this department will be transacted before Spring. Some few of our home mills are still engaged finishing up old contracts, but the majority have closed until the rate of wages and prices of material adjust themselves to the reduced figures of the manufactured article. Our quotations are still more or less nominal. In *steel rails* nothing worth noting has transpired.

OLD RAILS—One or two sales, at very low figures, of small straggling lots ex dock, constitute pretty much the whole business of the month. At the close there is a little inquiry for straight parcels, but the views of buyers are below those of holders, in nearly every instance.

SCRAP IRON—Very little inquiry for yard lots, but several parcels of mixed grades, from West India and South American ports, were disposed of at from $16 to $23 per ton. as in quality.

PIG IRON—The trade in American is confined mostly to the immediate wants of consumers. No disposition is yet shown, either on the part of buyers or sellers, to contract ahead. Many furnaces have been blown out, and the result will be to bring down labor, and particularly ores, to a more healthy point, and thus enable the trade of 1874 to start on a safe basis. In Scotch Pig there has been a moderate trade with some speculative buying, the effect of which has been to establish a higher range of prices than previously ruling, and to concentrate the small stock into one or at most two hands.

Monthly Market Review.

OFFICE OF EDWARD SAMUEL,
Iron Commission Merchant,
332 Walnut street.

PHILADELPHIA, Dec. 1, 1873.

AMERICAN PIG IRON.—For the first three weeks of the past month nothing transpired to break the monotony of declining prices and no sales, prices settling from $35 for No. 1, $31 for No. 2, $27 for No. 3, to present figures of $32 for No. 1, $28 for No. 2, $25 for Grey Forge, with reported sales during the last week of the month of 3,600 tons cinder white and 500 tons of grey at low figures. The inquiry for foundry irons is better, and we anticipate firmer prices as the result, although no large amount of business is likely to be done so late in the year. Many furnaces are out of blast, but the stock of iron is unusually large in producers' hands.

SCOTCH PIG is without movement in our local market. In New York, in the early part of the month, Eglinton was held at $38 to $39; Glengarnock, $39 to $40; Coltness a[illegible]nd prices have ruled about the same during the month. Stocks are light. Our last mail advices are dated Liverpool, Nov. 14, and quote as follows, F. O. B. in the Clyde: Gartsherrie, 120s.; Coltness, 122s. 6d.; Summerlee, 117s.; Langloan, 117s.; Calder, 117s.; Carnbroe, 113s. 6d.; Glengarnock, 113s. 6d; Dalmellington, 112s.; Eglinton, 113s.; F. O. B. Liverpool, about 7s. per ton more, all round.

	Tons.
Exports to the U. S. for month of October.....	8,437
" " " for 10 months, ending Oct. 31	96,395
Stock of Pig Iron in store, Glasgow, Dec. 25, '72..	106,919
" " " Nov. 7, '73...	37,615
Decrease.....	69,304

Our correspondent remarks that "the domestic consumption and shipments to the continent fully absorb present production, which is materially less than it was last year.

RAILS.—There have been some few inquiries afloat, but generally for time orders, which are refused by the mills unless perfectly secured. Some few sales of light sections have been made at from $65 to $67, mill, and one sale of 2,500 tons, 56 pounds, is reported under $61 at the mill. Would quote $61@$63 for heavy sections.

OLD RAILS are without notice. Some few odd lots have been sold in New York during the month at $35 for Ts, and a mixed lot of Ts and Us was reported sold as low as $32.50. There are no double heads offering.

MERCHANT BARS are dull, with the mills generally running on half time. Prices range from 2.8 cents per lb. to 3½ cents, according to quality and the necessities of sellers.

WROUGHT SCRAP has been dull and at low figures comparatively, with but few sales. Would quote from $30 to $35 for No. 1, according to selections.

Money, which was nearly impossible to procure in the early part of last month, has been gradually easing up, and rates are in consequence lower. Collections are reported as better, and the general tone of the market is decidedly improved.

METALS.

NEW YORK, Dec. 4, 1873.

IRON.—Duty: Bars, 1 to 1½ cents ₩ lb; Railroad, 70 cents ₩ 100 lbs.; Boiler and Plate, 1½ cents ₩ lb; Sheet, Band, Hoop, and Scroll, 1¼ to 1¾ cents ₩ lb; Pig, $7 ₩ ton; Polished Sheet, 3 cts. ₩ lb; Galvanized 2½; Scrap Cast, $6; Scrap Wrought, $8 per ton. All less 10 per cent. No Bar Iron to pay a less duty than 35 per cent. ad val.

	Store Prices.
Pig, Scotch—Coltness ₩ ton	45 00@— —
Gartsherrie	— —@48 00
Glengarnock	— —@42 00
Eglinton	40 00@41 00
Pig, American, No. 1	30 00@32 00
Pig, American, No. 2	28 00@29 00
Pig, American, Forge	25 00@— —
Bar Refined, English and American	— —@— —
Bar Swedes, assorted sizes gold	— —@157 50
	Store Prices, Cash.
Bar, Swedes, 1¾ to 5 x ⅜ & ¾ 2 sq. & 6 to 12 x ⅜ & ½	— —@— —
Bar, Refined, ⅝ to 2 in. rd. & sq. 1 to 6 in. x ⅜ to 1 in.	80 00@— —
Bar, Refined, 1¼ to 6 by ¼	85 00@— —
Bar, Refined, 2½ to 2¾ round 1 & 1¼ by ¼ & 5:16	87 50@— —
Large Rounds	90 00@105 00
Scroll	100 00@132 50
Ovals and half-round	107 00@127 50
Band	100 00@102 50
Horse Shoe	115 00@— —
Rods, ⅝ to 3-16inch	90 00@132 50
Hoop	117 50@157 50
Nailrod	8¾@ 9
Sheet, Russia, as to assortment (gold)	17 @ 17½
Sheet, Singles, D. and T. Common	—4½@— 5¾
Sheet, D. and T. Charcoal	—6¾@— 8
Sheet, Galv'd, list 10 per cent, discount	—@— —
Rails, English (gold), ₩ ton	— —@— —
Rails, American, at Works in Pennsylvania, currency	— —@— —

COPPER.—Duty: Pig, Bar, and Ingot, 5; old Copper 4 cents ₩ lb; Manufactured, 45 per cent. ad val.

	All Cash.
Copper, New Sheathing, ₩ lb	— @— 26
Copper Bolts	— @— 40
Copper Braziers, 16oz. and over	— @— 40
Copper Nails	— @— 45
Copper, Old Sheathing, &c. mixed lots	25 @— 23
Copper, Old, for chemical purposes, 14@16 oz	— @— —
Copper, American Ingot, Cash	23 @— —
Copper English Pig	— @— —
Yellow Metal, New Sheathing & Bronze	— @— 25
Yellow Metal Bolts	30 @— —
Yellow Metal Nails, Sheathing and Slat'g	— @— 28

LEAD.—Duty: Pig, $2 ₩ 100 lbs.: old Lead, 1½ cents ₩ lb Pipe and Sheet, 2¾ cents ₩ lb.

Spanish (gold)	6 87½@—
German, do.	6 87½@—
English do.	6 87½@7 00
Foreign, Refined	7 25 @7 50
Domestic do.	6 00 @6 12½
Bar (net)	9 25 @— —
Pipe (net)	— —@10 50
Sheet	— —@10 50

STEEL.—Duty: Bars and ingots, valued at 7 cents ₩ lb or under 2¼ cents; over 7 cents and not above 11, 3 cents ₩ lb; over 11 cents, 3½ cents ₩ lb, and 10 ₩ cent ad val. Store prices.

English Cast (2d and 1st quality) ₩ lb	— 17 @— 21
English Spring (2d and 1st quality)	— 9½@— 10½
English Blister (2d and 1st quality)	— 14 @— 18½
English Machinery	— 14½@— —
English German (2d an 1st quality)	— 12½@— 14½
American Blister "Black Diamond"	— —@— 11½
American, Cast, Tool do.	— —@— 17
American, Spring, do.	— —@— 11
American Machinery do.	— 11½@— 12
American German, do	— 9 @— —

TIN.—Duty: Pig, Bars, and Blocks, 15 ₩ cent. ad val.; Plate and Sheets and Terne Plates, 25 ₩ cent.; Roofing 25, ad val.

	Gold ₩ lb.
Banca	32 @32½
Straits	27½@—
English	26¾@—
English Refined Gold	27 @—

PLATES.

Fair to Good Brands.	Gold.	Currency
I. C. Charcoal, ₩ box	$10 00 @10 50	$11 25 @11 75
I. C. Coke	8 00 @ 8 50	9 00 @ 9 50
Coke Terne	6 75 @ 8 25	8 00 @ 9 25
Charcoal Terne	— — @10 00	11 25 @11 50

SPELTER—Duty: In Pigs, Bars & Plates, $1.50 p. 100 lb

Plates, Foreign (gold) p. 100 lb.	7 37½@—7 75
Plates, Domestic p. lb.	7¼@— 11

ZINC—Duty: Pig or Block, $1.50 per 100 lb.; Sheet 3½c. per lb

Sheet per lb.	—@— —

San Francisco Stock Market.

BY TELEGRAPH.

NEW YORK, Dec. 4, 1873.

The following report from the San Francisco Stock Board is dated Dec. 2nd. The most noteworthy feature in the report is the advance in Belcher, it being quoted at $91 per share.

Savage	—	—	99
Crown Point	—	—	102
Yellow Jacket	—	—	64
Kentuck, "New Issue"	—	—	14
Chollar Potosi	—	—	54
Gould & Curry "New Issue"	—	—	16¾
Belcher "New Issue"	—	—	91
Imperial	—	—	8¾
Raymond & Ely	—	—	57
Meadow Valley	—	—	14¾
Eureka C. V.	—	—	19
Ophir	—	—	—
Hale and Norcross	—	—	—

* These prices represent as nearly as possible the range, according to location of Mill.

† These figures included Steel.

THE ENGINEERING AND MINING JOURNAL.

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To Coal and Iron Men.

THIS Journal, founded in 1866, will enter with the approaching new year upon its seventeenth volume. We can point with a high degree of satisfaction to the history of eight years past, and to the present character and influence of the ENGINEERING AND MINING JOURNAL, as a testimony of our success in maintaining an impartial, intelligent, critical, scientific and practical organ, in this country, of the industries and trades directly or indirectly connected with engineering, mining, and metallurgy. We have stood, and we shall continue to stand, outside of political questions, devoting ourselves earnestly to the advancement of the sciences and arts which we represent. In addition to the papers and proceedings of the American Institute of Mining Engineers, officially published in this Journal only, universally recognized as interesting and valuable, and widely quoted in other periodicals, we shall continue to publish original papers and editorials on all appropriate subjects, bringing before our readers the latest results of inquiry and achievements of progress.

That we do not rest contented with what we have already accomplished, and that we are resolved to spare no pains in making this Journal the most trustworthy and comprehensive of its kind in the world, may be inferred from the announcement which we made incidentally last week, that we have determined to give a much wider range to our Coal and Iron Department, including in it not only prompt and full statistical reports of production, shipments, prices, sales, etc., but also abundant accounts, from special resident and travelling correspondents, of the condition and prospects of the mines and furnaces, with the aid of which dealers in coal and iron can foresee the course of the market—a matter of the highest importance.

This department will be under the charge of Mr. RICHARD P. ROTHWELL, C. E., M. E., one of the Vice Presidents of the American Institute of Mining Engineers, a gentleman whose scientific training in this country and abroad is supplemented by many years of practice as a mining engineer, and whose wide personal acquaintance with coal and iron mining has made him extensively known as a leading authority on the subject. Mr. ROTHWELL has made arrangements with correspondents in the principal coal and iron districts of the United States. The former editorial staff of the Journal will be maintained; and it is not proposed, in adding this new feature of interest and value, to sacrifice any of those which have earned for the paper its present reputation.

It has frequently been observed that "hard times" are precisely the times in which undaunted enterprise, by reason, perhaps, of its contrast with the general depression, most certainly wins the recognition of the public. It is in this belief that we have decided, even at the present not very propitious season, to incur the additional expense and labor involved in the re-organization and extension of our coal and iron department. We feel justified in appealing to our numerous friends for assistance in our enterprise. We ask no stronger endorsement than the verdict of those who have from the beginning, as subscribers and advertisers, tested the value and watched the course of the ENGINEERING AND MINING JOURNAL; and we doubt not that they will be ready, both to assist the canvassers whom we shall send into the field, and to use their own private influence in making our paper still more widely known.

THE French Minister of Commerce has been taking a trip among the iron works of his country and seems to have a proper appreciation of their importance. At Lyons he said that "he was firmly convinced that French trade and manufactures could only prosper by the devising of means of transport and cheap production to enable France to compete successfully with foreign countries." He laid great stress on the importance of inland navigation and said he contemplated the creation of a huge canal to establish a water communication between the Channel and the Mediterranean." Here certainly is encouragement to mining with a vengeance. The Minister thinks that the coal production of France can be largely increased and that the iron ore districts of the Loire can produce double what they have turned out, which this year amounts to 4,000,000 tons.

IN our article of last week on the excursions of the Easton meeting, we mentioned that the Andover Iron Co. proposes to widen the tunnel-head of one of its furnaces, and spoke of this as a step in the right direction. We ought to have remembered that this step had already been taken at the Glendon Iron Works. The No. 1 furnace at Glendon, which we mentioned as having been altered from 50 ft. to 60 ft. in height, and from 17 ft. to 18 ft. in greatest diameter, was at the same time enlarged at the tunnel-head from 10 ft., its former diameter, to 16 ft. In our notes on the Glendon Works the diameter at the tunnel-head of No. 1 was omitted, and hence, in writing the article referred to, we overlooked, for the moment, a fact which we must confess we ought to have remembered, since we knew it and should doubtless have recalled it upon reflection. It should be added that the Andover Company is not responsible for our oversight in this respect. Mr. KENT would be the last man to claim anything unwarranted by facts or unjust to his friends and neighbors of Glendon.

WE publish this week a long and interesting letter from Mr. LOESCHER on the CAZIN jig, and also a series of sections, more clearly illustrating its construction than did the one we gave in January last. Mr. LOESCHER's intimation that we have shown Mr. ENGELMANN undue favor, or that he has been "pushing" the UTSCH jig in our columns, is not just. We have published two papers on the subject, sent by Mr. ENGELMANN to the American Institute of Mining Engineers, just as we publish all other proceedings of that body, in full, as its official organ. If our recollection is correct, Mr. ENGELMANN has never sent us any communications, not even when he was himself attacked. Mr. CAZIN, on the other hand, has had four articles already, not counting editorials, and gets two more this week, making six. If anybody has been favored, it is he. But the truth is, that we do not favor one party over another, so far as giving each a chance to be heard is concerned. As for Mr. CAZIN's jig, we think highly of it, and the arguments urged by Mr. LOESCHER in its favor are worthy of consideration. But the evidence of actual results is not such as to permit a close comparison with the UTSCH jig, because it is vague and general, and based on appearances, not analyses. It is excellent so far as it goes, but it does not go so far as it would if it were more precise.

The Lürmann Closed Front.

A CONSIDERABLE period has elapsed since we last reported to our readers the progress of LÜRMANN's improvement in the construction of blast-furnaces. This improvement, it will be remembered, consists briefly, in a water-cooled cinder-block, through which the cinder-discharge takes place, thus permitting the furnace to be operated with a closed front. It was introduced into this country several years ago by Mr. GEORGE ASMUS, 90 Broadway, New York, assignee of LÜRMANN's patents, and we have recently made inquiry of Mr. ASMUS concerning the extent to which it has been adopted by American iron-masters, and the degree of success it has achieved. He expresses himself satisfied with the results obtained, and is confident that the closed front will certainly replace, sooner or later, the former primitive and wasteful system of the fore-hearth.

In the first stage of the introduction of this device, a serious difficulty was found in the fact that its practicability was doubted by iron-masters to such an extent as to prevent its fair trial. In some cases the closed front was discarded as soon as any trouble, no matter of what origin, was experienced in the running of the furnace. It required several years of practice to demonstrate that a properly constructed closed front is the right thing under all circumstances, and, moreover, that the manifold difficulties to which every blast-furnace is subject are more easily surmounted with the closed, than with the open front. Mr. ASMUS furnishes us the following list of furnaces, most of which have now been running more than three years with LÜRMANN fronts, and, according to the letters of the proprietors in his possession, have given the highest satisfaction.

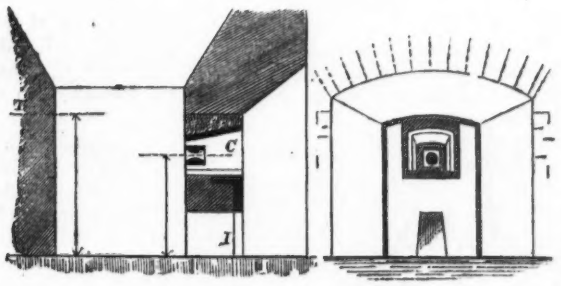
Schönberger, Blair & Co., Pennsylvania	Coke.
Muirkirk furnace, Maryland	Charcoal.
Brown, Bonnell & Co., Ohio	Raw coal.
Jackson Iron Company, Michigan	Charcoal.
Monticello furnace, Pennsylvania	Coke.
Cleveland Rolling Mill, Ohio	Raw coal.
Western Iron Company, Iowa	Raw coal.
Manhattan Iron Company, New York	Anthracite.
S. M. Carpenter, Ohio	Charcoal.
A. Bradley, "	"

Edge Hill Iron Company, Pennsylvania	Anthracite.
Hoover & Sons, Pennsylvania	"
Gaylord Iron and Pipe Company, Kentucky	Raw coal.
Belfast Iron Company, Ohio	"
Westermann Iron Company, Pennsylvania	"
Isabella furnaces, Pennsylvania	Coke.
Valley Iron Company, Sharon, Pennsylvania	Raw coal.
Cleveland Iron Company, Ohio	"
Siefert, McManus & Co., Pennsylvania	Coke.
Spearman Iron Company, "	Raw coal.
Pierce & Kelly, Pennsylvania	"

In the course of conversation concerning BÜTTGENBACH's construction of furnace-front, shown at the Vienna Exposition and at the meeting of the Iron and Steel Institute at Liege, Mr. ASMUS remarked that BÜTTGENBACH follows LÜRMANN's plan. He has no fore-hearth; and he taps the cinder through an opening cooled with water. The only difference in this part of BÜTTGENBACH's furnace consists in the shape of the cinder-outlet, which is, in his construction, a vertical slit, 18 to 25 inches high and ¾ of an inch wide, in a water-cooled plate; while LÜRMANN's cinder-block has a round hole, and is set at the proper height in such a way that it can be easily removed and replaced.

The purpose of BÜTTGENBACH's alteration is to facilitate the tapping of the cinder at different heights as the circumstances may require, if the furnace is out of order—the slit being filled with clay. On close consideration, however, it appears that LÜRMANN's original construction anticipates all this, so far as the exigencies of practice require. LÜRMANN's cinder-block, which, being the most exposed casting about the whole furnace, is purposely made very small and easy to replace, is surrounded by water-cooled plates in such a way that, in case of trouble, the cinder-block can be temporarily removed, the space filled with clay, and the cinder tapped any where on a vertical line extending six inches above and eight inches below the normal level. This principle is sufficiently illustrated without further explanation by the accompanying cut. None of the iron-masters

SECTION. FRONT VIEW.



LÜRMANN'S CINDER-BLOCK.

C, Cinder discharge.
I, Iron-discharge.
T, Level of tuyeres.

using the LÜRMANN front in this country have ever expressed a desire for a greater range of cinder-tap than they already have; and this is actually not more than about ten inches.

Mr. ASMUS finds it most convenient to use an arched water-cooled casting, similar to a tuyere-arch, to secure the cinder-arch, thus simplifying the water-connections. This saddle-shaped casting has been for some years in use at many furnaces, among which we may name the Jackson, Edge Hill, Westermann, Isabella, Cleveland, Spearman, etc. It answers much better than a fixed slit, ¾ of an inch wide, because it permits an opening to be made into the side of the furnace, in case of need, ten inches wide and fourteen inches high, without disturbing the rest of the construction in the least.

In some cases, the arched casting, which is in fact nothing but a larger cinder-block surrounding the small one, is employed without the latter, the cinder being tapped through the clay filling of the arch. This, however, is advisable in those cases only, in which very pure and rich ores are smelted, and, consequently, little cinder is made. The charcoal-furnace of the Jackson Iron Company at Lake Superior, for instance, uses the LÜRMANN patent in this way.

Whether the cinder-tap is made in front, on the side, or in the rear of the furnace, is a question of convenience merely, and of no material consequence; although, if practicable, the cinder-tap ought to be out of the way, leaving the iron-tap free of all incumbrances. The drawing given herewith shows both the iron-tap and the cinder-tap in front, as they are usually placed when this arrangement is attached to old furnaces.

LÜRMANN's improvement may be adapted to many different forms, as is always the case when a principle and not a mere detail of construction is involved in an invention. The main point, however, always remains the same; and it is in this that LÜRMANN's merit lies: a construction which gives a secure cinder-tap, directly from the hearth, and no recess in the hearth where half-smelted stock can gather, to make trouble.

ALL manufacturers of, or dealers in, mine supplies, such as powder, oil, blasting paper, fuse, picks, shovels, &c., should advertise in THE ENGINEERING AND MINING JOURNAL, as it is received by mining engineers and purchasing agents throughout the mining regions.

CORRESPONDENCE.

The Cazin Jig.

CINCINNATI, Nov. 20, 1873.

TO THE EDITOR—SIR:— With great interest I have followed the recent discussion in your journal in regard to wet and dry concentration. I do not intend to prolong it. Partisan, as I am, of wet concentration, I intend to make such statement of facts only, as will establish the actual standing of wet concentration in the shape of the latest improvements.

It is well known to all concerned, that at a great many places in these States the introduction of ore-concentration, by the aid of water, has been tried by such as relied on their own ingenuity. Failures were the frequent consequences. Thus a great deal of prejudice has been created; and in speaking of wet concentration, it should always be well understood, that not every appliance in concentrating ores by the aid of water deserves praise or should be recommended. It also is of great importance, that the American public should, at once, become aware, that not every mineral-washer is a master of his art, nor that every mining engineer, even after scientific education, is an authority in the matter of ore-dressing. If anywhere, it is in this branch of science, that theory and practical knowledge should be combined in order to insure success.

Mineral-dressing will never be done by one apparatus, but by the combination of different apparatus for *breaking*, *assorting* and *separation*. Your journal, designed to propagate useful knowledge with regard to mining, should point out such apparatus as deserve, at the present time, to be applied in preference to all others for this three-fold work in ore dressing.

BLAKE's Crusher has no competitor; KROM's steel-faced rollers break their passage to general introduction without resistance. In screens there is no competition yet, nor will any general feature of them be likely to prevail universally, since their construction depends too much on local requirements. For separation there appears to be a competition between CAZIN's One-Plunger Jig and the UTSCH Automatic Jig. An article in your paper (Vol. XV, No. 3) recommending CAZIN's One-Plunger Jig was followed by an eulogy of UTSCH's Jig from the clever pen of Mr. HENRY ENGELMANN, E. M., which gentleman again, when Mr. CAZIN's name had been before the public in defence of wet concentration, hastened to put the merits of the UTSCH Jig before the public.

I consider it a simple matter of justice, that the American invention (the One-Plunger), made and developed in this country, should at least have the same chance to be recognized by the American proprietors, as a foreign invention, the UTSCH Jig. Mr. KROM had his clever attorney in Judge BAKER; the inventor, Mr. UTSCH, has his diligent, by circumstances well favored, and, as it appears, deeply interested attorney in Mr. ENGELMANN. Will you then permit me, whose legitimation you will find by running over the names annexed to the Freiberg annual reports, from 1863 to 1866, to stand up for merit, where I really believe it to reside?

The One-Plunger Jig is a recent invention, and has to make its way. It is, therefore, very natural, that it cannot, like old improvements, claim the results of full years' runs. Though I cannot, therefore, speak of the experience of years, I may nevertheless report on what I have seen done by the One-Plunger Jig, entitled more than any other to the title of "automatic," so long as it has the belt on its pulley. The One-Plunger Jig was in position in an establishment, where, at the same time, other jigs with three or four plungers were at work. The One-Plunger Jig was used for concentrating fine sands. The material consisted of galena and baryta. The jig discharged perfectly clean galena from under the first sieve, the second sieve discharging below a mixture of predominantly baryta, with a small percentage of galena and pyrites—indicating that no galena actually escaped beyond the second sieve. All that was discharged from the second sieve, was, at the end of the day's work, or at intervals of intermission or diminution of the general feed, fed again to the first sieve; and then the second sieve discharged baryta and pyrites, proving that all the galena had been retained by the first sieve. The third sieve uninterruptedly discharged clean baryta.

The further development of this invention may be considered of greater importance, than may be anticipated at the first glance; since its full success would not only revolutionize the slow treatment of fine sands and slimes by buddles, but even permit the reduction to a minimum of the employment of the amalgamating and other metallurgical processes. In concentrating the bulk of argentiferous ores by the operation of this jig, amalgamation works would multiply their capacity at once and save considerable expense for work and mercury. It is, therefore, very natural that, after the above stated observation, I took sufficient interest in the invention to gather further information in regard to its application. As I formerly was occupied in Southern Illinois, and had become aware, that One-Plunger Jigs were introduced at a mine of that District, I wrote to the only friend in that neighborhood, from whom I could expect a report, sustained by scientific training and correct appreciation—to the physician of the place and his report runs thus:—

"In order to give you full satisfaction, I had to cultivate acquaintance with the old Welsh head-washer, Mr. PERRY, whom you know, and to extract all particulars from him, so as to make me understand what was going on. The old man, after some conversation, confessed, that he had been much prejudiced against the new jigs, but declared that the jigs did better work, than any he had seen during the thirty years he had been a practical washer in Wales, in Lombardy, and in the United States. By this you see, that the jigs are considered a success. I will now specify what I saw. Mr. PERRY himself was busy around the jig, receiving the finest size of material, viz: material, which had passed through a screen having circular holes, 1-50 of an inch in diameter, (probably ½ m. m.) The stream containing this fine material did not run direct to the jig, as Mr. PERRY explained, on account of there being too much water with it; but passed through a very big spout with alternate partitions, one allowing the stream to pass above, and the other forcing the stream to pass under,

thus giving the stream undulating curves to pass up and down. The bottom of the spout was funnel-shaped and provided with outlet-valves, there being eight such valves, from which a permanent stream of apparently muddy water escaped, which was conducted to the jig. At the end of the before-described spout, perfectly clean water was discharged, after having passed through some floating saw-dust, apparently placed behind some wire cloth, in order to retain the last small particle, which might not have been deposited in the former compartments.

"A thick mud arrived at the jig, which was dissolved in water coming up through the sieves from below, as well as by the motion of the opposite plunger, as by a supply of fresh water discharged under about twelve feet head through a two-inch pipe directly under the plunger. As you are aware of the general construction and mode of working of the jig, it only remains to me to state what results it presented. There are five sieves on each jig. The jig which I observed most closely discharged from the valve under the first sieve entirely clean, very fine-grained galena; from the valve under the second sieve, a mixture of some blende, some galena and a small quantity of copper-pyrites; under the third sieve, blende with a few specks of the copper; from under the fourth sieve, a mixture of predominantly fluor-spar with some blende; from under the fifth sieve, clean fluor-spar; and over the end of the partition of the fifth sieve went continually, what Mr. PERRY calls the tailings, a mixture of limestone, calcareous spar, slate, etc., etc. What was discharged from the second and fourth sieves was, during noon time, when general feeding was stopped, or at the end of the day's work, fed to the first and third sieves, respectively; by which manipulation the small quantity of galena escaping in the first operation, was retained by the first sieve, and the blende and the copper by the third.

"My impression is, that no valuable material whatever escaped with the tailings. I took some samples from under each sieve which I send by express."

It appears to be the principle, on which the One-Plunger Jig is made to work, that each sieve, intended to concentrate clean material, should have a reserve sieve, which, constituting a broad interval for the deposition of a mixture, permits clean material to be deposited fore and aft of it. Thus, by the re-feeding of a small portion of concentrated material, an ultimate entirely clean separation of all valuable particles is attained.

This report, from an entirely uninterested party, well able to observe closely sustained, as it is, by my own previous observations, and my acquaintance with the construction of the Jig in question—justifies the following conclusions:—

1. The One-Plunger Jig, passing the ore over a row of sieves, altogether from 12 to 16 feet long, offers in proportion more guarantee against escape and loss of valuable material, than the UTSCH Jig, which has only about four feet in length. This length, however, is not even used, because it is the principle of the UTSCH Jig to allow light particles to escape right from the first sieve, without having them passed over any others.

2. The plunger hanging on a pivot beyond the end of the last sieve, and being vibrated by a pitman connected to the end opposite to the first sieve, the stroke or the lift of materials on the sieves is highest on the first sieve and less on each successive one, thus diminishing the action in the same proportion as valuable material lessens in quantity in the matter to be concentrated, the entire motion being effected in the most simple way, with fewer parts of machinery, than applied in the UTSCH Jig.

3. The wrist running in the oscillating strap being movable on the crank by a screw passing through the center of the crank, the lift of the plunger is changeable, thus permitting the operation to accommodate the lift with even the smallest variations to the requirements of the ore and the sizes to be worked upon—a facility greatly advantageous in comparison with eccentric and other strap-motions, which are stiff and without such a changeable wrist.

4. The direction of the revolving crank being against the oscillating strap from above, and occupying one-third of each revolution of the down-stroke and two-thirds for the up-stroke, results in a quick and sudden lift of the material on the sieves, and a comparatively slower deposition of the particles arranged according to their specific gravity. In this motion, full perfection is attained for the application of the principles, on which jigging is based.

5. The longitudinal flow of material, being on a right angle with the direction of the shaft, the entire jig can be raised or lowered on either of its ends, in order to accelerate or retard the speed of the material passing the sieves, without interfering with the regular motion of the machinery.

All those, who have had the opportunity to observe the working of mineral-dressing arrangements will, like me, appreciate the importance of the fact that the One-Plunger Jig, as it is, accommodates itself to all the emergencies and necessities occurring by a variation in the quality of ore and percentage of valuable material, but also to the use of one and the same apparatus for treating different sizes. Moreover, the practical engineer will appreciate, that all the motions in the machinery of the One-Plunger Jig are correct, and do not permit those small but frequently recurring irregularities, resulting in friction and wear, as in all jigs, in which plungers are fastened in their center to an oscillating crank or an eccentric. There is no apparent reason, why the velocity or number of lifts with such a regular and unimpeded motion should not be increased, there being no other limits to this than the consistency of the material, out of which the parts are constructed. Now, it may be adopted as the result of experience, that a perfect jigging motion applied to slimes, requires only the sufficient number and length of strokes, or in other words, sufficiently quick and small lifts accommodated to the small size of particles, in order to separate as well fine sands and slimes as coarse grains; and it is in this that, according to the above statement, CAZIN'S One-Plunger Jig excels all others. The advocate of the UTSCH Jig asserts, that the slimes, resulting from that jig, have to be dressed on buddles. The One-Plunger Jig separates slimes also.

The quantity of work done by a jig is dependant on the area of sieve, under the supposition, that the same number of revolutions and same height of lift be applied, if two different jigs shall be compared. If, therefore, the UTSCH Jig concentrates on *nine* jigs 1050 tons a month, or about four tons a day on each jig, it is obvious, that the One-Plunger Jig, with about double the area of sieve, should do in proportion so much more.

Although in dimensions and perfection of construction there are many differences between these two machines, in principle there is but one. The UTSCH Jig has partitions forcing the material on the sieves to pass below and not above the same, and it allows particles to escape ultimately before passing over the whole length of sieve, the heavier and more valuable parts being supposed to pass either through the sieves or under the partitions.

This arrangement is very well adapted to the requirements of the Zinc Works of Messrs. MATHIESSEN & HEGELER, where the jigs are used to concentrate most of the galena out of the zinc-ores, and where the owners are satisfied nevertheless to lose from 2 to 2½ per cent. of galena, as Mr. ENGELMANN admits; but it offers indeed, insufficient guarantee against loss in the treatment of argentiferous ores, letting tailings escape right from the first sieve instead of passing them over 12 to 16 feet length of sieve.

By this and other reasons, above mentioned, it is obvious, that the UTSCH Jig may well have its application in the treatment of ores of inferior value; but in that of valuable ores the preference must be awarded to CAZIN'S One-Plunger Jig, of which I enclose the diagrams as I find them published in the London *Mining Journal*, No. 1932, and the *Berg und Hüttenmännische Zeitung*, No 22, 1872,

E. LOESCHER, M. E.

Casualties.

Now that the use of fuel in the form of gas is so widely extending in metallurgical and other industries, it may perhaps be interesting to notice two accidents reported in a recent number of the *Annales des Mines* by M. the Inspector-General de FOURCY, which took place during the cleansing of hot gas conduits. The first occurred at the steel works of La Chatleassiète, the reheating furnaces of which are supplied with gas by a horizontal wrought-iron main, 150 ft. long, and 4 ft. in diameter. The main is supported by six hollow columns. Each month two gangs of six men are employed in removing the soot and tar by means of rakes. Each workman enters the main by turn, and remains there as long as his strength allows, five or six minutes at the outside. The operation occupies four hours.

On the day of the accident the main had been already cleaned for a length of about 55 ft. A workman had been in the main some time without returning, and a second went in to seek him; this one almost instantly fell, calling for assistance. Two other men, also engaged in the main, were asphyxiated. The four men were extricated only after great difficulty, and only two of them recovered.

A similar accident occurred at the works of Terre Noir, in a tube 3 ft. 3 in. in diameter, collecting the hot gases from a blast furnace. The deposit from these gases is so hard that it has to be removed by tools from the surface of the plate. To clean the main, which is done every five or six weeks, the connexion between the main and the furnace is stopped, the manhole is opened, and workmen are introduced to clean it, and stationed at intervals of 12 ft. or 14 ft. It was during this work that a man was suffocated. These two accidents show the danger of cleaning these gas mains. It is necessary to increase the number of openings, to provide means of ventilation, and perhaps it would be advisable to create a current of air through the tube by a steam jet.

Coal Cutting by Machinery in England.

THE introduction of machinery in coal mining as an economical substitute for manual labor has been rather unsuccessful, not so much because it has been found impossible to cut coal by machinery, as because the working of the machines required nearly as many men as would be required to mine the same amount of coal without machinery. The subject is nevertheless one which most certainly will receive practical development, and appears even now to have made a great step towards its solution in some of the largest of the English mines.

Probably the most serious drawbacks to the general adoption of coal cutting machines will be found in the practical difficulty of carrying compressed air—the only suitable motive power—through such great lengths of pipe as would be necessary in an extensive colliery.

The following statement of the results attained in the great Hetton collieries in the north of England, shows the present condition of the question, and will be of interest chiefly to those having charge of bituminous coal mines. The large and regular beds of the Kanawha, W. Va., of Pittsburgh, Pa., of Brazil, Ind., and of parts of the Richmond, Va., basin, would be particularly well adapted for machine mining.

After repeated experiments with nearly every coal-cutting machine invented in the country, the Hetton Coal Company have at last demonstrated, not only the practicability, but the superior advantages, of mechanical coal-cutting over the old system of hewing by hand. Rather more than a year ago the company made arrangements for introducing into their Elemore Colliery, at Easington Lane, one of WM. BAIRD & Co.'s machines, generally known as the Gartsherrie coal-cutter, from the name of the colliery at which it was brought to perfection. More recently, another Gartsherrie machine has been introduced into the same colliery, and as both machines have now been at work for some time, it is possible to speak with confidence and certitude as to the results of their operations.

Up to the present time, the greatest quantity of coal cut at Hetton by one of these machines was 175 feet, or about sixty-seven tons, in a shift of nine hours, commencing at seven o'clock at night and terminating at four o'clock in the morning. This result was accomplished only a few nights since, and, with a good face to work upon, it is believed that it could not

only be maintained, but even considerably increased. From private sources we learn that at the Espleside Colliery, Gartsherrie, a machine of the same kind recently cut 377 feet, equal to 90 tons, in nine hours; another machine cut 350 feet; and another 200 feet, in the same length of time, thus showing that at the Elemore pit the minimum work of the machine has not yet been attained. The usual output of a hewer in the same seam that the Gartsherrie machine is applied to at Hetton is only 2½ tons per shift; so that if the average work of the machine were maintained at even 65 tons per shift, it would in that time accomplish the labor of 25 men. The Elemore Pit is now being divided into sections, with the view of applying these machines on a larger and more complete scale. Each section will measure 60 yards by 20, and it is intended that each machine shall go across a face 120 yards in length in about 12 hours. By the working of four machines on this plan it is calculated that a produce of about 400 tons of coal per day can easily be obtained. This output would be equivalent to the labor of 150 men, and as it requires only three men or a skilled mechanic and two lads to work each machine, there would be thus a saving of about 140 men's labor in this colliery alone. This is no exaggerated estimate of the actual capabilities of the machine in a good seam, but it is not to be supposed that equal results could be obtained in every colliery. There are some seams to which coal cutting machines are altogether unsuitable. At Job's Hill Colliery, near Darlington, an attempt was made some time ago to introduce Winstanley's machine, but the coal was too hard to enable the machine to do its duty effectively, and its use was therefore abandoned. Nor is it to be assumed that the introduction of coal-cutting machinery will greatly reduce the number of men employed in coal mines. It will, of course, lighten very materially the labor of the collier, but its effect will rather be to increase the output of coal than to supersede the services of the miners. At the Elemore pit it is necessary to employ fourteen men after each machine to take the coal down while another batch of colliers is required to hew all the narrow places and remove all angles in order that the machine may have a due length of face to work upon. Men are also required to remove the double row of chucks along the face—chucks being blocks of wood about 20 inches long and 4 to 6 inches thick, used to support the roof while the machine is "boring."

The question is often asked—if coal-cutting by machinery be practicable, and if it yield better results than hewing by hand, why is it not more generally adopted? The easiness and indifference of masters, their disinclination to leave the old lines, and the risk attendant upon the application of mechanical power, are doubtless the chief hindrances to the progress of mechanical coal-cutting. At the Elemore Colliery, for example, many thousands of pounds have been spent to little or no purpose in the laudable enterprise of bringing the system to perfection. The company have tried nearly every machine that professed to accomplish the hewing of coal. Jones's, Donnesthorp's Harrison's and other machines have all been tested on their merits, and found wanting in one way or another. In 1873, Firth's coal-cutting machine, respecting which the patentee read a paper at the Bradford meeting of the British Association, was tried at the Elemore Colliery, and its use has been continued with occasional stoppages, since that time. But after the Hetton Company had overcome all the major difficulties attending their first application of the Firth machine, they still found that its results were far from commensurate with the cost and trouble which it involved. At the Bishop's Close Colliery, FIRTH'S machine has excavated as much as fifteen square yards, representing as many tons, in an hour; but at Elemore the highest results obtained did not exceed four or five square yards per hour. Only two hands are employed to look after the Firth machine. A skilled mechanic works the machine, which, like the Gartsherrie machine, is driven by compressed air, and a boy rakes away the "coorvings," or small coal, from the front of the machine, and puts sprags in to keep the top up and prevent the machine from being stopped. We may add that we commit no breach of confidence when we say that the Hetton Company give a decided preference to the Gartsherrie machine over all other machines they have yet tried.

Before coal-cutting machines can be introduced into a colliery, a very considerable cost has to be incurred. Although the first cost of the Gartsherrie machine by itself is not more than £200, very extensive plant requires to be laid down in order to work it, and thus cost is incurred all the same, whether there are a dozen or only one in operation. At Elemore an outlay of nearly £10,000 has taken place in providing the requisite appliances for compressing the air by which the coal cutting machines are actuated. Four boilers on VICKER'S patent, with oscillating fire bars, have been erected for generating the steam necessary to work the air compressor. These boilers are each 33 feet in length, and five feet six inches diameter. The air compressor is fitted up in a building erected specially for its reception. Its diameter is 28 inches, the length of stroke being four feet. The steam cylinder which actuates the compressor has a diameter of 16 inches, and a stroke of two feet. The steam cylinder piston works four strokes for one of the other piston. The air leaves the compressor at a pressure of 45 pounds to the square inch, when one machine is working, but when both machines are at the face this pressure is reduced to 20 or 30 lb. Over the cylinder of the compressor there is a shell, within which a constant supply of water is in circulation for the purpose of keeping the compressor cool. The air leaves the compressor in a metal pipe, six inches in diameter, and is passed through the receiver in a pipe of the same size. Between the compressor and the receiver, the air travels a distance of about 40 yards; the distance from the receiver to the top of the shaft is 50 more; from the top of the shaft to the level of the seam where the machines are employed the depth is 90 fathoms, and from the bottom of the shaft to the mouth of the drawing road the distance is 900 yards more. The air is carried all this distance in six-inch metal pipes, with not more than 2½ to 3 lb. loss of pressure. From the mouth of the drawing road to the machine the air is conveyed in india rubber tubes. The machine is so compact that it can be taken up or down the shaft in the cages used for the tubs, and it is moved on wheels adapted to the gauge of the colliery.—*Newcastle Chronicle.*

The South Wales Iron Field.

FAMOUS as South Wales is for its production of iron, the actual area devoted to this industry is not of very large extent. The coal-field, as is known, extends for about 63 miles in length, being divided into two uneven portions by Caermarthen Bay. It is in the larger one, extending from Pontypool to Caermarthen Bay, that the iron manufactures flourish; and as in the whole field it has been estimated, after the most careful calculations, that over 30,000,000,000 of tons of coal still remain to be extracted, whilst the supply of iron ore is almost unlimited, it may be safely conjectured that the industry created within a century is destined to go on in prosperity for many years. Leaving out of consideration any competition that may arise in America, the markets of Europe alone must furnish a ready outlet for all the iron that may be manufactured, whilst the demand in our own country, great though it at present is, is a continually increasing quantity. The iron district round Merthyr Tydvil has a population of about 50,000 souls, most of whom are engaged in the extraction and working of the coal and iron with which it abounds. The strata of coal, which is of excellent quality, are thick, whilst parallel to them run the deposits of iron ore, thus enabling the two to be raised simultaneously, and at the smallest outlay. To this fact a great deal of the activity which characterizes this portion of Wales is to be attributed; and to it industries which, whilst enriching the individual, have given employment to thousands, and added to the wealth of the nation, are mainly due.

Benefit from a Strike.

IN a late address before the Manchester Scientific and Mechanical Society, SIR WILLIAM FAIRBAIRN said:— "Let me give you an example which strikingly illustrates the benefits as well as the inconveniences of a sudden cessation of labor. Some forty years ago, when I first introduced the double-flued boiler, and had large orders on hand, and being unwilling to allow the men to dictate the terms on which I should engage apprentices and conduct the work, I received notice of a turn-out, which immediately took place, and the works were suspended for a number of weeks. In this dilemma, with impatient customers, I was driven to the necessity of supplying the place of the riveters, in resuming the works, by a passive and unerring workman, which, from that day to this, has never complained, and did as much work in one day as was formerly accomplished by twelve of our best riveters and assistants in the same time. By the introduction of this machine I had much less trouble than I expected, as I had only to desire the foreman to reverse the action of the punching machine, and with proper dies to rivet the plates instead of punching them. In six weeks from that date we had the riveting machines at work, making tighter joints and executing the work with greater perfection than could possibly be done by the hammer."

Suit for Wages.

A SUIT of considerable importance to employers was lately decided in the Common Pleas Court at Hartford, Ct. Suit was brought by two men against LANDERS, FRARY & CLARK, of New Britain, Conn., to recover wages due for labor. The defence claimed that suit was commenced before the regular pay-day, and that the men had left the employ of the company without giving four weeks' notice, as its rules require. Both of these points were admitted, but in answer it was said that notice was not given because the company made a small deduction on the price previously agreed upon, and that the company, by denying all liability on the ground that what would otherwise be due to the men was forfeited by their leaving without notice, waived their right to insist upon the men's waiting until the regular pay-day before obtaining wages or bringing suit. Judge STODDARD (then holding court) found that a reduction in the price agreed upon by the company made a new contract, and the men could not be compelled to remain four weeks, under the circumstances. He also held that the denial of any liability on the part of the company gave the plaintiffs the right to sue at once. The defence have carried the case to the Supreme Court.

Tellurium.

MR. G. KÜSTEL contributes to the *Bulletin* of the Chemical Society of Paris a method of detecting tellurium and sulphur in ores. If the metal is present in the state of telluride of gold, the author uses sodium amalgam. The powdered ore is placed in a capsule with a little water and mercury, and afterwards a little sodium amalgam. If tellurium is present, the water takes a violet color. If it contains sulphur, the water blackens silver-foil. If sulphide of iron is present, the violet color produced by the telluride of sodium may be masked by the precipitate occasioned. In such cases the water is poured off, a fresh quantity of water added, and the test is recommenced with a fragment of sodium amalgam.

Mr. F. STOLBA publishes in the same journal the following: Tellurous acid, mixed with an excess of alkali, is reduced by glucose; if the solutions are dilute, and a large quantity of glucose be employed, the whole of the tellurium is deposited as a black powder. Selenious acid is not reduced under the same circumstances.

Engineering and Mechanical Notes.

MR. HENRY DAVEY described, at a late meeting of the Society of Engineers in London, some improved pumping machinery which he is building for a colliery. The improvement consists merely in the use of a compound instead of a simple engine. The expansive force of steam is therefore utilized to the utmost. Mr. DAVEY explains the falling off in the duty of Cornish engines within late years by the reduction in the degree of expansion made necessary by a proper regard to the strength of the piston rod. He said: "In Cornwall, some years ago, during the race for economy of fuel, engineers carried expansion in a single cylinder to the utmost limit. Taylor's 85-inch Cornish engine, having a 10-feet stroke, was worked at the United mines with a ten-fold expansion, and did a duty of 112 millions, but it ultimately broke down from the excessive strain thus thrown on the pump rods. Since then a lower and safer grade of expansion has been employed. This engine proved that which has been proved over and over again—namely, that such a grade of expansion cannot be safely employed in a single cylinder engine. Cornish engines are now worked with a three-fold and at most a five-fold, expansion, and this partly accounts for the falling off in the duty reports. Experience has proved that the second cylinder is necessary where expansion is carried to a great extent. The author would here remark that the practice of recording the duty which has been carried out in Cornwall might be advantageously adopted in the colliery districts, but the report should be more complete than those of Cornwall, and should give the grade of expansion and the boiler pressure employed, besides separating the duty of the boiler from that of the engine. Thirty years ago the average duty of pumping engines in Cornwall was sixty-seven millions, whereas now it scarcely reaches forty-eight millions, and it is a great pity that the duty reports have not recorded the grades of expansion, for then we should probably be able readily to discover the cause of the falling off in efficiency." By the introduction of a second cylinder the maximum strain thrown on the piston and its attachments is greatly reduced, and a greater uniformity of motion and of strain is secured. In Mr. DAVEY's new engine the variation of force during the stroke is about three to one with an eight-fold expansion, whereas with a single cylinder engine it would be eight to one. The compound engine consists of a pair of horizontal cylinders placed end to end, the bottom of the high pressure cylinder forming one of the covers of the low pressure cylinder. There are two piston rods to the low pressure piston which pass through tubes cast on the jacket of the high pressure cylinder, so that they are in the same plane with the rod of the high pressure piston. These three rods are coupled to one crosshead, to which is attached the connecting rod for working the pumps. The cylinders are firmly secured to a strong girder bed, and the conductor is carried on a separate bed at the rear of the engine.

AN interesting illustration of the facility with which—in these days of rapid communication—the surplus skilled labor of one country may be made to redress the deficient working power of another, has been afforded during the construction of the New Viennese aqueduct. It was found necessary to bring water to Vienna from the Kaisersbruun—distant 58 miles—and the Sixtenstein, about 10 miles nearer. The contract was adjudged to Mr. GABRIELLI, contractor for the English Admiralty; the works were commenced in 1870, and a period of four years was allowed for their completion. But at this particular period the extension of Vienna was so rapid and sudden, that Mr. GABRIELLI soon found that if he relied upon the local workingmen, all hope of executing the work in the time stipulated must be abandoned. Owing to the building of the new town all skilled labor, especially that of masons, had become scarce and dear, while the auxiliary half-skilled or unskilled labor that poured in from the adjacent provinces proved, as usual—in spite of its apparent cheapness—excessively dear. Mr. GABRIELLI, therefore, determined to employ Italian workmen, of whom a large number had been drawn northward by the development of the Austrian and Hungarian railway systems. By engaging about 14,000 of these men, who come in "gangs" of a score, and usually take small sub-contracts, Mr. GABRIELLI was enabled to complete his work in a year less than the time stipulated.

THE Union Pacific Railroad Company has been testing the value of artesian wells on the plains. It has commenced several artesian wells in Wyoming Territory, ranging in depth from 326 to 1145 feet, at an average cost of $9.67 per foot. Each of these wells furnishes an ample supply of pure water, varying in quantity from 8000 to 2100 gallons per hour. The artesian well which is being sunk under the direction of the War Department at Fort A. D. Russel, near Cheyenne, has reached a depth of nearly 1000 feet, and the boring is progressing rapidly and favorably.

AMONG the recent ingenious devices for utilising the electric spark, is that which substitutes it for the ordinary flint or percussion cap on firearms. By the aid of a small galvanic battery, within the handle of the pistol or gun, or by the convenient arrangement of a Leyden jar and rubber, the current is generated, and conducted by a wire to the cartridge. The contact of the wire with the cartridge may be effected by a simple press-pin or lever.

A CHIMNEY lately fell at Gravesend, England, which was 220 feet in height above the surface of the ground; 22 feet in external diameter at the level of the surface of the ground; 11 feet in external diameter at the top. The thickness of the brickwork 3 feet 9 inches at the level of the surface of the ground, and for 26 feet 3 inches above, decreasing half a brick (4½ inches) at each 26 feet 3 inches in height. The outside batten (3 inches per foot) was straight from the base to the top. It was entirely new, the scaffolding not having been removed. The cause of its failure was not elucidated at the coroner's inquest, and a verdict of accidental death was rendered, several persons having been killed in the fall.

MINING SUMMARY.

California.

THE PANAMINT MINES.

Correspondence of the Inyo *Independent*.

Leaving Little Lake we struck off due east, passing over sand and lava most of the way. About 20 miles from Little Lake you strike the first water; twelve miles farther you come to another spring—excellent water—in a canyon; passing down this canyon you come to Panamint Valley; crossing the valley you come to what is known as "Postoffice Spring," at the base of Panamint mountain. Leaving the camping place you bear a little north of east; 3½ miles brings you to the mouth of Surprise Canyon. Upon entering this canyon you are struck with the rough, unfinished work of a volcano of the unknown ages; passing up the canyon you arrive at the newly-laid out city known and recorded as Panamint City. The canyon is not over three hundred yards wide where the town site is laid out, but is about two miles in length.

But little work has been done on any of the mines or lodes, but those that have been worked show a large body of good ore. The Little Chief has some work done on it, and shows a body of ore some four feet in width. The assays made go from $196 to $806. This mine is bonded for $10,000; is owned at present by TIPTON & Co. The next ledge we come to is the North Chief; no work done of any account, but it shows a good body of mineral. This ledge is owned by your humble servant, which accounts for no work being done. In crossing over the hill we passed over quite a number of small ledges; nearly all show good indications. The next ledge we come to is the Marble Lode, and it has a huge ledge. It will average twelve feet in width, and can be traced, I think, three miles. The northern portion shows the greatest amount of mineral. Among the locators are BOB STEWART and KENNEDY. The former bonded his interest in this ledge and the "Wonder" lode for $35,000. The north end of this ledge is owned by KENNEDY & Co., and is known as the "Wyoming." The next lode of note we visited was the Wonder of the World, a big name, but it deserves it. It runs nearly parallel with the famous Marble Lode, at a distance, I should judge, on a bee line, of about two miles. This ledge shows more minera han any in the camp or district. I believe I can safely say, without stretching my conscience a great deal, that there is enough ore in sight to keep ten forty-stamp mills running two years. The smallest lode I visited showed mineral.

There are some locations made some six or eight miles north, which show good ore, and the owners say they can make a stake if they can keep on the top of the "bed rock" until they develop their mines sufficiently to bring into note. There are quite a number of Lead Lodes, sufficient for smelting, should their ores be such that cannot be reduced by mill process. The district has abundance of wood for fuel and sufficient water for all purposes.

The altitude of the town site, I believe, Mr. KRAUS, the surveyor, said was about 7,000 feet.

Nevada.

THE DAYTON MINE.

From the Gold Hill *News*.

The main Hoisting Works Building is situated about 200 ft. from the south end of the location; is 30x50 feet in size, with a carpenter shop 30x26 feet, and blacksmith shop 36x26 adjoining; the whole being built of the best material and in the most substantial manner possible. The hoisting is done by a neat, compact little engine of 30-horse power.

The shaft has two compartments, and was sunk in solid blasting rock from the surface down; is well timbered, and is one of the best in the State. Stepping on the cage we glided in a moment smoothly and noiselessly to the Third Station, or 400-foot level. Following the main west tunnel, 145 feet from the shaft, brought us to the ledge, where turn tables have been put in and a drift run in on the ore vein south some 50 feet, the entire distance being in milling ore. The ledge is very solid, requiring continual blasting. A drift has been run north on the ledge a distance of 85 feet, all the way in good ore. The ledge at this point is so very solid that no timbering whatever will be necessary until the ore is entirely stoped out. Ascending to the Second Station and proceeding along the main west drift 195 feet, we again reached the ledge, which at this point is 25 feet in width of solid ore. From where the ledge was struck, a drift has been run south 112 feet, the entire distance in good ore, and a drift north 60 feet along the line of the ledge, also in fine ore, spots of which are very rich in gold. At that point the direction of the drift was changed to a more westerly course until the west clay wall of the ledge was reached, along which the drift was run in a northerly course 60 feet, when it encountered a body of ore exceedingly rich in gold, 10 to 12 feet in width and which has been prospected a distance of 50 feet in length, to a point directly under a winze which is being sunk from the first level above, for the double purpose of prospecting the ledge and ventilating the lower level.

The winze, is down 105 feet, following the line of the ledge, the bottom in good milling ore. A raise to connect with the winze has been started from the north drift at the second station and is up 40 feet, also in good ore, leaving only about 50 feet to run to complete the connection between the levels. Much of the rich body of ore developed in the north drift at the second station gives average assays of from $300 to $500 per ton; and choice samples run up to the tens of thousands. A sample of the fine ore taken and horned out in our presence, showed a prospect of fine gold that would bring a glitter of joy to the eyes of an old Californian.

The Company have about 1,000 tons of ore on their dump ready for reduction, some of which is so rich in gold that it has been necessary to employ a watchman to prevent the carrying of portions of it away. In the face of all the different drifts on the several levels blasting and digging out the ore is being prosecuted without the least fear of its giving out, and the prospects of the development of a good paying mine are excellent beyond a doubt.

Colorado.

THE DIAMOND TUNNEL.

From the *Colorado Mining Review*.

This tunnel has been driven up to Oct. 15th, 275 feet, representing an average rate of progress since the commencement of the work in January of this year, of about 30 feet per month. The section of the bore is seven by eight feet, and the rock

passed through has consisted largely of very tough material, in places extremely so, so that the advancement made has been remarkably rapid, in consideration of the fact that no cutting machinery has been employed except the ordinary hand drill. As the work went on, a wooden tramway, sheathed with iron, was laid along the west side, leaving ample room for a second track as soon as it will be found necessary. The mouth of the tunnel is timbered solidly, nine feet wide in the clear, and all the necessary out-houses erected for the steady and rapid pushing of the work. The tunnel bears north 20° west, directly into the nest of veins in Cherokee Gulch that have produced so heavily during the past two years, and are generally considered as among the most valuable that have been opened in the district. The most important of these are the Baxter, Morse, Antelope, Hikes, Laura Dale, Dives, Eagle Bird, Pelican, Corry City, Silver Plume and Pay Rock. These mines have, since their discovery, produced about one million and a half dollars, two-thirds of which represents the yield of the last two years, during which time several of them have been energetically and continuously worked. The most noted of the number is the Pelican, from which nearly $700,000 has been taken since the Spring of 1871. The deepest workings upon this vein are now 400 feet below the surface, at which point ore has been found in larger and more continuous seams than near the surface, and at the same time the prospect for meeting with good mineral at still deeper points is very encouraging. The Dives, another of the most prominent veins of the belt, has produced in the neighborhood of $100,000, and is at present yielding as good ore as has ever come out of the mine. The course of the Diamond Tunnel will carry it a little west of the center of this belt, and at a distance of not more than 1200 feet from its mouth, it will intersect every one in the above list at a depth varying from 200 to 1000 feet. The Pelican, according to survey, will be opened 640 feet from the surface; the Dives 450 feet; the east Eagle Bird 350 feet; and the Corry City 1000 feet. The latter is a gigantic fissure upon which comparatively little work has been done. When the mineral deposits of Sherman and Republican Mountains are opened at these depths by the tunnel, there is every reason to expect that very large bodies of ore will rapidly return the money expended in reaching them. The enterprise is one of the prominent ones of Griffith District, not only on account of the extensive belt of lodes that will be tapped, but by reason of the saving in mining expenses that will be realized by working the veins from below instead of above. So long as the present high prices for the treatment of our ores continue, the reduction in the cost of breaking and transporting a ton, where no hoisting or drainage is required, will add a large percentage to the available amount of mineral that can be profitably produced by the mines.

American Institute of Mining Engineers.

OFFICIAL BULLETIN.

Announcements to Members and Associates.

I. The ENGINEERING AND MINING JOURNAL, which is the Organ of the Institute, and contains its proceedings, transactions and notices of meetings, will be sent to each Member and Associate on the payment of his annual dues. Back numbers cannot, as a rule, be sent.

II. Dues are payable in advance at the annual (May) meeting. Remittances should be made, as far as possible, by P. O. Order, payable to the Secretary.

III. The first volume of Transactions of the Institute is in course of preparation and will be sent, as soon as issued, to all members not in arrears.

THOMAS M. DROWN, Secretary.

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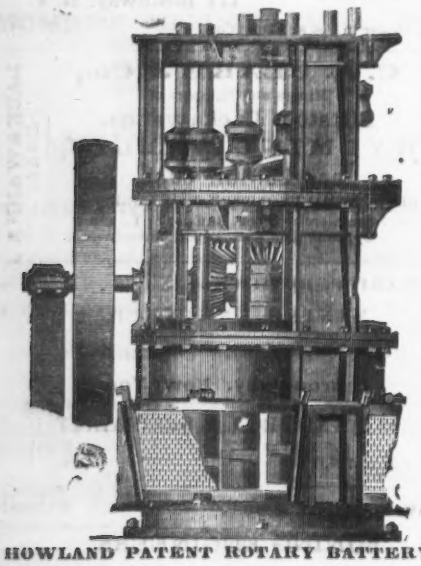

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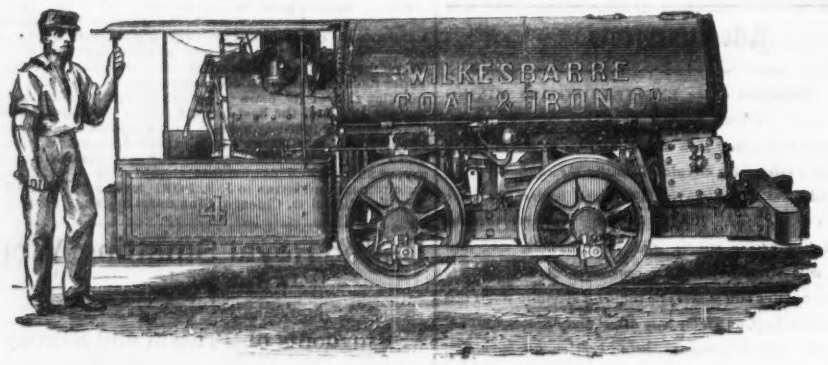

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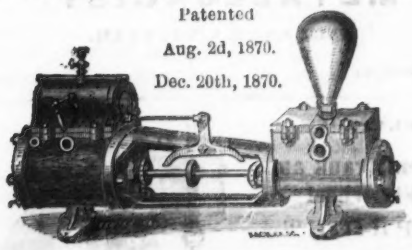

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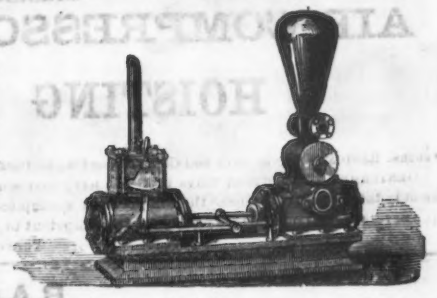

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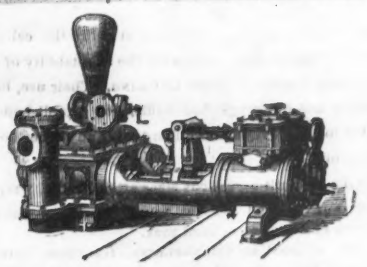

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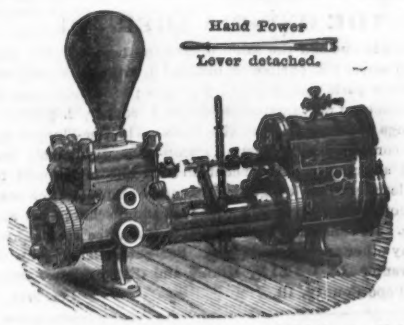

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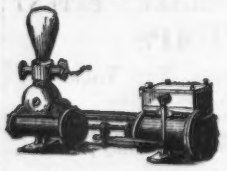

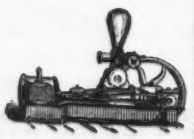

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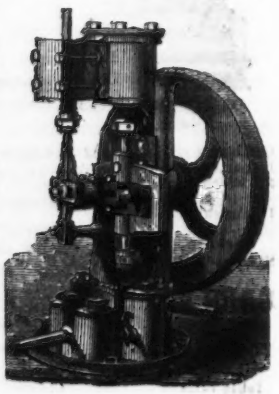
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